Educational Center School

100 Walnut Street
Newton, MA 02459

Generator Upgrade

PREPARED FOR

City Of Newton

Public Buildings

SETTI WARREN / MAYOR

DRAWING LIST

SHEET	TITLE
	ELECTRICAL
E0.00	ELECTRICAL - LEGEND, NOTES, DETAILS, AND ABBREVIATIONS
E0.01	ELECTRICAL - SPECIFICATIONS
E0.02	ELECTRICAL - SPECIFICATIONS
ED3.00	ELECTRICAL - GROUND FLOOR DEMOLITION POWER PLAN
ED7.00	ELECTRICAL - ONE LINE RISER DEMOLITION PLAN
E1.00	ELECTRICAL - SITE PLAN
E2.00	ELECTRICAL - GROUND FLOOR STAND-BY LIGHTING PLAN
E2.01	ELECTRICAL - FIRST FLOOR STAND-BY LIGHTING PLAN
E2.02	ELECTRICAL - SECOND FLOOR STAND-BY LIGHTING PLAN
E3.00	ELECTRICAL - GROUND FLOOR NEW POWER PLAN
E7.00	ELECTRICAL - ONE LINE RISER NEW WORK PLAN
E8.00	ELECTRICAL - DETAILS

PREPARED BY

RDK ENGINEERS

Richard D. Kimball Company, Inc
200 Brickstone Square
Andover, MA 01810-1488

The Fargo Building
451 D Street Suite 801
Boston, MA 02210-1964

P 978-475-0298
F 978-475-5768
W www.rdkengineers.com

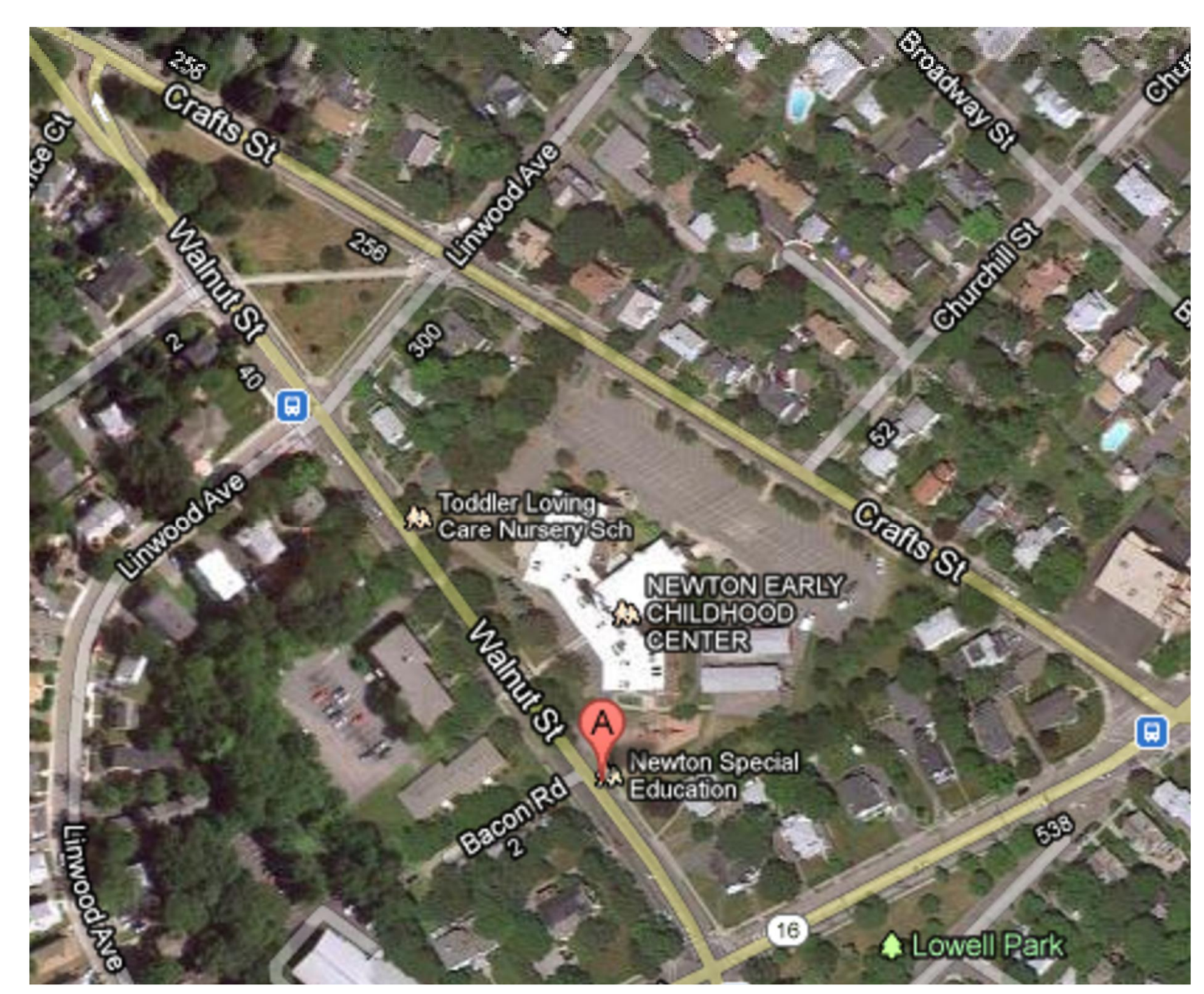
RDK ENGINEERS
Daniel Wall, P.E.
Principal
DWall@rdkengineers.com
Richard D. Kimball Company, Inc.
200 Brickstone Square
Andover, MA 01810-1488
P 978-296-6218
F 978-296-6219
W www.rdkengineers.com

RDK ENGINEERS
Wade Wright
Sr. Mechanical Engineer
WWright@rdkengineers.com
Richard D. Kimball Company, Inc.
200 Brickstone Square
Andover, MA 01810-1488
P 978-296-6228
F 978-296-6229
W www.rdkengineers.com

RDK ENGINEERS
Kyle Marzeoti
Jr. Electrical Engineer
KMarzeoti@rdkengineers.com
Richard D. Kimball Company, Inc.
200 Brickstone Square
Andover, MA 01810-1488
P 978-296-6402
F 978-296-6337
W www.rdkengineers.com

RDK ENGINEERS
Scott Groth, PE, LEED AP
Sr. Electrical Engineer
SGroth@rdkengineers.com
Richard D. Kimball Company, Inc.
200 Brickstone Square
Andover, MA 01810-1488
P 978-296-6301
F 978-475-5768
W www.rdkengineers.com

LOCUS PLAN



Educational Center School

RDK ENGINEERS
Andover, MA - Boston, MA - Amherst, MA
Durham, NC - Charlotte, NC

RDK Engineers
200 Brickstone Square
Andover, MA 01810-1488

T.978-475-0298
F.978-475-5768
W. www.rdkengineers.com

REVISIONS

▲	DATE	CHK	DESCRIPTION

SEAL

PROJECT

NUMBER
20100320.00

DATE
01-23-2012

NEWTON PUBLIC SCHOOL
EDUCATIONAL CENTER SCHOOL
GENERATOR UPGRADE
NEWTON, MA 02459

DRAWING

DRAWN BY
MW

CHECKED BY
WW

SCALE
NONE

TITLE SHEET

BID DOCUMENTS
01-23-2012

1/8" = 1' - 0" 0 8' 16'

T0.00

MOTOR & CONTROLS LEGEND

ATS	AUTOMATIC TRANSFER SWITCH
G	GENERATOR
100AF 90AT CB	ENCLOSED CIRCUIT BREAKER IN NEMA TYPE 1 ENCLOSURE, UNLESS OTHERWISE NOTED "100AF" – INDICATES 100AMP, 3–POLE FRAME CIRCUIT BREAKER "90AT" – INDICATES 90AMP TRIP
ANN	GENERATOR REMOTE ANNICIATOR

ONE LINE SYMBOLS LEGEND

XXAF XXAT	CIRCUIT BREAKER, FIXED "XXAF" INDICATES FRAME SIZE "XXAT" INDICATES TRIP
	GROUND CONNECTION
N E	AUTOMATIC TRANSFER SWITCH
R21A	PANELBOARD

SITE LEGEND

UE	UNDERGROUND ELECTRIC
A #	UNDERGROUND SECTION, REFER TO SECTION DETAIL "A" INDICATES DETAIL LETTER "#" INDICATES DRAWING NUMBER

WIRING DEVICE LEGEND

J	JUNCTION BOX
PB	PULLBOX

BRANCH CIRCUIT & FEEDER LEGEND

	BRANCH CIRCUIT OR FEEDER CONCEALED IN FINISHED AREAS
	BRANCH CIRCUIT OR FEEDER, CONCEALED IN OR UNDER FLOOR SLAB
	BRANCH CIRCUIT OR FEEDER TURNING UP TOWARDS OBSERVER
	BRANCH CIRCUIT OR FEEDER TURNING DOWN AWAY FROM OBSERVER
E	BRANCH CIRCUIT FOR EMERGENCY BATTERY DC CIRCUIT, MINIMUM 2#10 IN 3/4"C. UNLESS OTHERWISE NOTED.
	FLEXIBLE CONNECTION TO DEVICE. RACEWAY AND CONDUCTOR RATING TO MATCH ASSOCIATED BRANCH CIRCUIT OR FEEDER.

POWER DISTRIBUTION

	208Y/120 VOLT PANELBOARD, SURFACE MOUNTED REFER TO SCHEDULE OF PANELBOARDS
	208Y/120 VOLT PANELBOARD, RECESSED MOUNTED REFER TO SCHEDULE OF PANELBOARDS
T3	DRY TYPE TRANSFORMER "T3" – INDICATES KVA RATING OF TRANSFORMER REFER TO DRY TYPE TRANSFORMER SCHEDULE
M	UTILITY METER AND SOCKET

EXISTING EQUIPMENT LEGEND

XM	EXISTING EQUIPMENT TO REMAIN
X	EXISTING EQUIPMENT TO BE REMOVED
XR	EXISTING EQUIPMENT TO BE RELOCATED
XN	NEW LOCATION OF EXISTING RELOCATED EQUIPMENT
NR	EXISTING EQUIPMENT TO BE REMOVED AND NEW EQUIPMENT TO BE INSTALLED ON EXISTING BRANCH/FEEDER
	EXISTING EQUIPMENT FOR INFORMATION ONLY– INDICATED BY SYMBOL WITH LIGHT AND OUT OF FUNCTION LINE TYPE
	EXISTING EQUIPMENT TO BE REWORKED– INDICATED BY SYMBOL WITH DASHED AND IN FUNCTION LINE TYPE

LEGEND NOTES:

1. REFER TO SPECIFICATIONS, ARCHITECTURAL DRAWINGS, APPLICABLE SCHEDULES AND DETAILS FOR ADDITIONAL INFORMATION ASSOCIATED WITH EACH DEVICE ILLUSTRATED ON THIS LEGEND.

2. SUBSCRIPTS ILLUSTRATED ON THE LEGEND WITH ONE SYMBOL ONLY TO MINIMIZE SPACE. ANY SUBSCRIPT INDICATED WITHIN A LEGEND FAMILY MAY BE APPLIED TO A CORRESPONDING SYMBOL.

3. ABBREVIATIONS SUCH AS "WP" MAY BE APPLIED TO ANY SYMBOL.

LIGHTING FIXTURE LEGEND

ES2	EXIT SIGN LIGHTING FIXTURE, CEILING, PENDENT MOUNTED, ARROWS AND EXIT FACE (SHADED) AS INDICATED
ES1	
EW1	EXIT SIGN LIGHTING FIXTURE, WALL MOUNTED, ARROWS AND EXIT FACE AS (SHADED) AS INDICATED.
EB1	EMERGENCY LIGHTING BATTERY UNIT WITH DOUBLE LAMP HEADS. (CATALOG# LITHONIA ELM618 OR EQUAL)

ABBREVIATIONS

A/AMP	AMPERE	KW	KILOWATT
AC	ALTERNATION CURRENT	KWH	KILOWATT HOURS
ADA	AMERICAN WITH DISABILITIES ACT	LTG	LIGHTING
AF	AMPERE FRAME	MCB	MAIN CIRCUIT BREAKER
AFF	ABOVE FINISHED FLOOR	MEC	MASSACHUSETTS ELECTRICAL CODE
AFG	ABOVE FINISHED GRADE	M/G	MOTOR/GENERATOR SET
AIC	AMPERE INTERRUPTING CAPACITY	MH	MANHOLE
AL	ALUMINUM	MLO	MAIN LUGS ONLY
AT	AMPERE TRIP	MTD	MOUNTED
ATS	AUTOMATIC TRANSFER SWITCH	MTG	MOUNTING
AWG	AMERICAN WIRE GAUGE	NC	NORMALLY CLOSED CONTACT
B	BURIED	NEC	NATIONAL ELECTRICAL CODE
C	CONDUIT	NO	NORMALLY OPEN CONTACT
CA	CABLE	NTS	NOT TO SCALE
CATV	CABLE TELEVISION	#	NUMBER
CCTV	CLOSED CIRCUIT TELEVISION SYSTEM	OPD	OVER CURRENT PROTECTION DEVICE
CB	CIRCUIT BREAKER	POS	PROVIDED UNDER OTHER SECTIONS
CKT	CIRCUITS	PVC	POLYVINYL CHLORIDE
CPU	CENTRAL PROCESSING UNIT	PWR	POWER
℄	CENTERLINE	RGS	RIGID GALVANIZED STEEL
dB	DECIBEL	RMS	ROOT MEAN SQUARE VALUE
DC	DIRECT CURRENT	RPM	REVOLUTIONS PER MINUTE
DWG	DRAWING	SN	SOLID NEUTRAL
EC	ELECTRICAL CONTRACTOR	SWBD	SWITCHBOARD
EMT	ELECTRIC METALLIC TUBING	TB	TERMINAL BLOCK
FDR	FEEDER	TEL	TELEPHONE
FLMT	FLEXIBLE LIQUID TIGHT METALLIC TUBING	TERMN	TERMINAL
FREQ	FREQUENCY	TSP	TWISTED SHIELDED–PAIR
GEC	GROUNDING ELECTRODE CONDUCTOR	TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSER
GFI	GROUND FAULT INTERRUPTING	TYP	TYPICAL
GND	GROUND	UG	UNDERGROUND
HH	HANDHOLE	UNO	UNLESS NOTED OTHERWISE
HP	HORSEPOWER	UPS	UNINTERRUPTIBLE POWER SUPPLY
HVAC	HEATING, VENTILATING AND AIR CONDITIONING	UTP	UNSHIELDED TWISTED–PAIR
HZ	HERTZ	V	VOLTS
IG	ISOLATED GROUND	VA	VOLT–AMPERE
JB	JUNCTION BOX	VSD	VARIABLE SPEED DRIVE
KVA	KILOVOLT–AMPERE	W	WATTS
		WP	WEATHERPROOF

RDK ENGINEERS

Andover, MA - Boston, MA - Amherst, MA

Durham, NC - Charlotte, NC

RDK Engineers
200 Brickstone Square
Andover, MA 01810-1488

T.978-475-0298
F.978-475-5768
W. www.rdkengineers.com

REVISIONS

	DATE	CHK	DESCRIPTION

SEAL

PROJECT

NUMBER
20100320.00

DATE
01-23-2012

NEWTON PUBLIC SCHOOL
EDUCATIONAL CENTER SCHOOL
GENERATOR UPGRADE
NEWTON, MA 02459

DRAWING

DRAWN BY
KVM

CHECKED BY
SG

SCALE
NONE

ELECTRICAL
LEGENDS, NOTES
& ABBREVIATIONS

BID DOCUMENTS
01-23-2012

E0.00

ELECTRICAL SPECIFICATION

ELECTRICAL SPECIFICATIONS

PART 1 – GENERAL

1. GENERAL PROVISIONS: DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF WORK IN CONTRACT. REFER TO ALL DRAWINGS ASSOCIATED WITH THIS PROJECT (EACH TRADE) FOR EXACT LOCATION OF ALL EQUIPMENT AND REQUIRED MOUNTING HEIGHTS.

2. SCOPE: PERFORM WORK AND PROVIDE NEW MATERIAL AND EQUIPMENT AS SHOWN ON DRAWINGS AND AS SPECIFIED IN THIS SECTION OF THE SPECIFICATIONS, SCOPE TO INCLUDE BUT NOT LIMITED TO ELECTRICAL DEMOLITION, DIESEL GENERATOR RATES 150kW/2084/120V/3P/4W, UNDERGROUND DUCTBANK, GENERATOR PAD AND PROTECTION, SITE RESTORATION, PANEL BOARDS, ATS, RACEWAY AND CONDUCTORS, CONTROLS, EMERGENCY BATTERY UNITS, TRANSFORMERS, SAFETY DISCONNECT SWITCHES, AND TESTING AND START–UP. PROVIDE ALL COMPONENTS AND MATERIALS, WHETHER SPECIFICALLY SHOWN OR NOT, THAT ARE NECESSARY TO MAKE THE SYSTEMS COMPLETE AND FULLY OPERATIONAL. WORK SHALL INCLUDE, BUT NOT BE LIMITED TO: 1) THE DESIGN INTENT AS ILLUSTRATED ON THESE DRAWINGS, 2) ALL TESTING AND CERTIFICATIONS NECESSARY FOR COMPLIANCE AND ANY REQUIRED REMEDIAL ACTIONS AND RETESTING DUE TO FAILURE, 3) ALL REQUIREMENTS FOR THIS PROJECT INCLUDED IN THE "NARRATIVE REPORT FOR COMPLIANCE WITH THE ENERGY CONSERVATION SECTION OF THE STATE BUILDING CODE – APPROVAL AND ACCEPTANCE", 4) REQUIREMENTS FOR THIS PROJECT INCLUDED IN THE "NARRATIVE REPORT FOR COMPLIANCE WITH THE FIRE PROTECTION AND LIFE SAFETY SYSTEMS SECTION OF THE STATE BUILDING CODE – FIRE PROTECTION CONSTRUCTION DOCUMENTS".

3. SITE VISIT: VISIT AND CAREFULLY EXAMINE SITE TO IDENTIFY EXISTING CONDITIONS THAT MAY AFFECT WORK OF THIS SECTION BEFORE SUBMITTING BID. NO EXTRA PAYMENT WILL BE ALLOWED FOR ADDITIONAL WORK CAUSED BY UNFAMILIARITY WITH SITE CONDITIONS THAT ARE VISIBLE OR READILY DISCERNED.

4. RELATED WORK: THE FOLLOWING WORK IS NOT INCLUDED IN THIS SECTION AND WILL BE PROVIDED UNDER OTHER SECTIONS: 1) TEMPORARY LIGHTING AND POWER FOR USE DURING CONSTRUCTION AND TESTING UNLESS SPECIFICALLY NOTED IN OTHER SPECIFICATION SECTIONS, 2) TELECOMMUNICATIONS WIRING AND DEVICES UNLESS SPECIFICALLY NOTED ON THE DRAWINGS 3) AUTOMATIC TEMPERATURE CONTROL AND DIRECT DIGITAL COMMUNICATIONS WIRING UNLESS SPECIFICALLY NOTED ON THE DRAWINGS AND 4) PAINTING.

5. CODES, STANDARDS, AUTHORITIES AND PERMITS: ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST EDITIONS OF THE STATE BUILDING CODE, THE STATE ELECTRICAL CODE, NFPA, ANSI/NECA INSTALLATION STANDARDS AND OTHER APPLICABLE CODES, REGULATIONS AND LAWS OF LOCAL, STATE AND FEDERAL GOVERNMENT, OTHER AUTHORITIES HAVING JURISDICTION AND APPLICABLE BASE BUILDING STANDARDS AND SPECIFICATIONS. CODES, LAWS AND ORDINANCES PROVIDE A BASIS FOR THE MINIMUM INSTALLATION CRITERIA. THESE DRAWINGS AND SPECIFICATIONS ILLUSTRATE THE SCOPE REQUIRED FOR THIS PROJECT, WHICH MAY EXCEED MINIMUM CODE, LAW AND STANDARDS CRITERIA. GIVE NOTICES, FILE PLANS, OBTAIN PERMITS AND LICENSES, PAY BACKCHARGES AND OBTAIN NECESSARY APPROVALS FROM UTILITY COMPANIES AND AUTHORITIES HAVING JURISDICTION AS REQUIRED FOR THE EXECUTION OF ALL WORK ASSOCIATED WITH THIS PROJECT.

6. INTERPRETATION OF DOCUMENTS: ADVISE THE ENGINEER IN WRITING (RFI) PRIOR TO PROCEEDING WITH PROCUREMENT OR INSTALLATION THAT THE DESIGN INTENT IS UNCLEAR OR THAT CONSTRUCTION DOCUMENTS DO NOT COINCIDE WITH MANUFACTURER'S RECOMMENDATIONS. ALL COSTS FOR REWORK NECESSARY TO RESOLVE DISCREPANCIES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

7. REQUEST FOR INFORMATION: RFI ISSUED TO RESOLVE A CONFLICT OR DISCREPANCY SHALL BE PROVIDED WITH THE PREFERRED SOLUTION VIA WRITTEN DESCRIPTION OR SKETCH.

8. SUBMITTALS: PROVIDE SPECIFIED MATERIALS AND EQUIPMENT UNLESS "EQUAL" OR "APPROVED EQUAL" IS EXPLICITLY INDICATED ON THE DRAWINGS. DEVIATIONS TO SPECIFIED MATERIALS SHALL BE AT THE SOLE RISK OF THE CONTRACTOR, WHO SHALL BE RESPONSIBLE FOR ALL ASSOCIATED CHANGES TO THIS AND OTHER TRADES. SUBMITTALS SHALL INDICATE REVIEW AND APPROVAL BY THE RESPONSIBLE CONTRACTOR. SUBMIT FOR REVIEW (6) SETS OF MANUFACTURER'S PRODUCT DATA FOR ALL LIGHTING, LAMPS WITH ANY APPLICABLE UTILITY REBATE FORMS FILLED OUT; DEVICES AND PLATES; PANELBOARDS, CIRCUIT BREAKERS AND TRANSFORMERS; AND DISCONNECT SWITCHES. ALLOW ENGINEER A MINIMUM OF 10 WORKING DAYS FOR PROCESSING AND REVIEW OF EACH SUBMISSION.

9. OPERATION AND MAINTENANCE DATA: SUBMIT (3) SETS OF OPERATING AND MAINTENANCE MANUALS INCLUDING SYSTEM DESCRIPTION, WIRING DIAGRAMS, WRITTEN WARRANTY, RECOMMENDED SPARE PARTS AND ROUTINE MAINTENANCE REQUIREMENTS WITH RECOMMENDED INTERVALS FOR ALL SUPPLIED EQUIPMENT.

10. RECORD DRAWINGS: CAD RECORD DRAWING FILES SHALL BE SUBMITTED AT THE COMPLETION OF THE PROJECT SHOWING THE "AS–BUILT" CONDITION INCLUDING WORK INSTALLED AND ALL MODIFICATIONS OR ADDITIONS TO ORIGINAL DESIGN. OBTAIN THE AUTOCAD FILES FOR PREPARATION OF AS–BUILT DRAWINGS FROM THE ARCHITECT. THE ARCHITECT AND ENGINEER ARE NOT GRANTING ANY OWNERSHIP OR PROPERTY INTEREST IN THE CAD DRAWINGS BY THE DELIVERY OF THE CAD FILES. THE RIGHTS TO USE THE CAD FILES AND DRAWINGS ARE LIMITED TO USE FOR THE SOLE PURPOSE OF ASSISTING IN THE PERFORMANCE OF CONTRACTUAL OBLIGATIONS WITH RESPECT TO THIS PROJECT. ANY REUSE AND/OR OTHER USE WILL BE AT THE CONTRACTOR'S SOLE RISK AND WITHOUT LIABILITY TO THE ARCHITECT AND ENGINEER.

11. WARRANTIES: WARRANTY INSTALLATION IN WRITING FOR ONE YEAR FROM DATE OF OWNER'S ACCEPTANCE OF CERTIFICATE OF SUBSTANTIAL COMPLETION. REPAIR, REPLACE OR PROVIDE TEMPORARY ACCOMMODATIONS FOR DEFECTIVE MATERIALS, EQUIPMENT, WORKMANSHIP AND INSTALLATION THAT DEVELOP WITHIN 24 HOURS OF NOTIFICATION. WARRANTY SHALL INCLUDE A CONTACT PERSON (NAME AND 24 HOUR TELEPHONE NUMBER) FOR SERVICE REQUESTS. CORRECT DAMAGE CAUSED WHILE MAKING NECESSARY REPAIRS AND REPLACEMENTS UNDER WARRANTY PERIOD AT NO ADDITIONAL COST.

12. COORDINATION: CONFER WITH ALL OTHER TRADES RELATIVE TO LOCATION OF ALL APPARATUS AND EQUIPMENT TO BE INSTALLED AND SELECT LOCATIONS SO AS NOT TO CONFLICT WITH OR HINDER PROGRESS OF WORK OF OTHER SECTIONS. WORK INSTALLED THAT CREATES INTERFERENCE OR RESTRICTS ACCESS REQUIRED BY CODE OR TO CONDUCT MAINTENANCE AND/OR ADJUSTMENTS SHALL BE MODIFIED AT NO ADDITIONAL COST TO THE OWNER.

13. SUPPORTS: INCLUDE ALL STRUCTURAL STEEL SUPPORTS, HANGER BRACKETS, ETC., REQUIRED FOR THE EXECUTION OF THE WORK OF THIS SECTION. HANGERS SHALL BE PREFINISHED CHANNEL AND THREADED ROD USED WITH APPROVED CLAMPS, HARDWARE, ETC. CHANNEL INSTALLED IN EXTERIOR LOCATIONS SHALL BE GALVANIZED STEEL WITH STAINLESS STEEL HARDWARE.

14. CUTTING AND PATCHING: INCLUDE ALL CORING, CUTTING, PATCHING AND FIREPROOFING NECESSARY FOR THE EXECUTION OF THE WORK OF THIS SECTION. STRUCTURAL ELEMENTS SHALL NOT BE CUT WITHOUT WRITTEN APPROVAL OF THE ARCHITECT. PROVIDE FIRE STOPPING TO MAINTAIN THE FIRE RATING OF THE FIRE RESISTANCE–RATED ASSEMBLY. ALL PENETRATIONS AND ASSOCIATED FIRE STOPPING SHALL BE INSTALLED IN ACCORDANCE WITH THE FIRE STOPPING MANUFACTURER'S LISTED INSTALLATION DETAILS AND BE LISTED BY UL OR FM.

15. HOISTING, SCAFFOLDING AND PLANKING: INCLUDE THE FURNISHING, SET–UP AND MAINTENANCE OF ALL HOISTING MACHINERY, CRANES, SCAFFOLDS, STAGING AND PLANKING AS REQUIRED FOR THE EXECUTION OF WORK FOR THIS SECTION.

16. SAFETY PRECAUTIONS: LIFE SAFETY AND ACCIDENT PREVENTION SHALL BE A PRIMARY CONSIDERATION. COMPLY WITH ALL OF THE SAFETY REQUIREMENTS OF THE OWNER AND OSHA THROUGHOUT THE ENTIRE CONSTRUCTION PERIOD OF THE PROJECT. FURNISH, PLACE AND MAINTAIN PROPER GUARDS AND ANY OTHER NECESSARY CONSTRUCTION REQUIRED TO SECURE SAFETY OF LIFE AND PROPERTY.

17. ACCESSIBILITY: ALL WORK PROVIDED UNDER THIS SECTION OF THE SPECIFICATION SHALL BE SO THAT PARTS REQUIRING PERIODIC INSPECTION, MAINTENANCE AND REPAIR ARE READILY ACCESSIBLE. WORK OF THIS TRADE SHALL NOT INFRINGE UPON CLEARANCES REQUIRED BY EQUIPMENT OF OTHER TRADES,

18. PROTECTION OF WORK AND PROPERTY: THIS CONTRACTOR SHALL BE RESPONSIBLE FOR THE CARE AND PROTECTION OF ALL WORK INCLUDED UNDER THIS SECTION UNTIL THE COMPLETION AND FINAL ACCEPTANCE OF THIS PROJECT. PROTECT ALL EQUIPMENT AND MATERIALS FROM DAMAGE FROM ALL CAUSES INCLUDING, BUT NOT LIMITED TO, FIRE, VANDALISM AND THEFT. ALL MATERIALS AND EQUIPMENT DAMAGED OR STOLEN SHALL BE REPAIRED OR REPLACED WITH EQUAL MATERIAL OR EQUIPMENT AT NO ADDITIONAL COST TO THE OWNER. PROTECT ALL EQUIPMENT, OUTLETS AND OPENINGS, AND ROOF PENETRATIONS WITH TEMPORARY PLUGS, CAPS AND COVERS. PROTECT WORK AND MATERIALS OF OTHER TRADES FROM DAMAGE THAT MIGHT BE CAUSED BY WORK OR WORKMEN UNDER THIS SECTION AND MAKE GOOD DAMAGE THUS CAUSED. DAMAGED MATERIALS ARE TO BE REMOVED FROM THE SITE; NO SITE STORAGE OF DAMAGED MATERIALS WILL BE ALLOWED. ANY DAMAGE TO EXISTING SYSTEMS AND EQUIPMENT CAUSED BY THIS CONTRACTOR DURING INSTALLATION SHALL BE REPAIRED AND/OR REPLACED AT THIS CONTRACTOR'S EXPENSE TO THE COMPLETE SATISFACTION OF THE BUILDING OWNER.

19. SEISMIC RESTRAINT REQUIREMENTS: PROVIDE SEISMIC RESTRAINTS AS REQUIRED IN ACCORDANCE WITH THE STATE BUILDING CODE. A REGISTERED PROFESSIONAL STRUCTURAL ENGINEER, LICENSED IN THE APPLICABLE STATE FOR THE PROJECT LOCATION, SHALL PREPARE THE SEISMIC RESTRAINT DESIGN AND CERTIFY THAT THE DESIGN IS IN COMPLIANCE WITH THE STATE BUILDING CODE REQUIREMENTS.

20. PROJECT CLOSEOUT: A CERTIFICATE OF COMPLETION SHALL BE ISSUED BY THE CONTRACTOR INDICATING THAT THE INSTALLATION IS IN CONFORMANCE WITH THE CONSTRUCTION DOCUMENTS AND ALL APPLICABLE LOCAL, STATE AND FEDERAL STATUTES AND CODES. ALL SUBMITTALS, AS–BUILTS, O&M MANUALS, AND BALANCING REPORTS ARE TO BE PROVIDED, FOR ENGINEER'S REVIEW, PRIOR TO REQUEST FOR COMPLETION CERTIFICATES. IN ADDITION, AND ALSO PRIOR TO REQUEST FOR COMPLETION CERTIFICATES, ALL PUNCH LIST ITEMS MUST BE COMPLETED TO THE SATISFACTION OF THE ENGINEER. THE CONTRACTOR MUST VERIFY THAT ALL SEQUENCES OF OPERATIONS AND CONTROLS HAVE BEEN INCORPORATED AND ALL SYSTEMS AND EQUIPMENT ARE WORKING PER THE SPECIFIED SEQUENCES OF OPERATIONS. A BLANK CONTRACTOR'S CERTIFICATE FORM CAN BE FURNISHED BY RDK ENGINEERS UPON REQUEST. FINAL OBSERVATION/ WALK–THROUGH BY THE ENGINEER SHALL BE CONDUCTED AFTER RECEIPT OF THE CERTIFICATE OF COMPLETION. PREMATURE REQUESTS FOR FINAL OBSERVATION/WALK–THROUGHS THAT REQUIRE REOBSERVATION OF DEFICIENT ITEMS WILL RESULT IN BACK CHARGES OF THE COSTS ASSOCIATED WITH THE REOBSERVATION.

PART 2 – PRODUCTS

1. IDENTIFICATION: NAMEPLATES SHALL INDICATE EQUIPMENT TAG, VOLTAGE CHARACTERISTICS AND SOURCE OF POWER. REFER TO NAMEPLATE DETAIL FOR ADDITIONAL INFORMATION.

2. RACEWAYS AND CONDUIT: RIGID GALVANIZED STEEL CONDUIT (RGS) SHALL BE UTILIZED WITH THREADED FITTINGS ONLY. ELECTRICAL METALLIC TUBING (EMT) SHALL BE UTILIZED WITH SET SCREW TYPE FITTINGS. PROVIDE CONDUIT EXPANSION FITTINGS WITH EXTERNAL BONDING JUMPERS EQUAL TO OZ GEDNEY TYPE EX FOR RGS AND TYPE TX FOR EMT WHEN CROSSING EXPANSION JOINTS. UL LISTED LIQUID TIGHT FLEXIBLE METAL CONDUIT (LFMC) AND FLEXIBLE METAL CONDUIT (FMC) SHALL BE USED FOR FINAL CONNECTIONS TO EQUIPMENT WHERE FLEXIBILITY OR VIBRATION ISOLATION ARE REQUIRED. LFMC SHALL BE UV RESISTANT WHEN INSTALLED IN AN EXTERIOR LOCATION.

3. WIRE AND CABLE: ALL CONDUCTORS SHALL BE TYPE THHN/THWN OR XHHW, COPPER, RATED 75°/90°C, 600 VOLT INSULATION UNLESS OTHERWISE NOTED. MINIMUM SIZE CONDUCTOR SHALL BE #12 AWG COPPER. CONDUCTORS #10 AWG AND LARGER SHALL BE STRANDED; #12 AWG AND SMALLER SHALL BE SOLID. EACH BRANCH CIRCUIT AND FEEDER SHALL BE PROVIDED WITH AN INSULATED GROUNDING CONDUCTOR SIZED IN ACCORDANCE WITH NEC TABLE 250.122. CONDUCTOR COLOR CODING SHALL BE IN ACCORDANCE WITH THE DETAILS ON THESE DRAWINGS. COLOR CODING SHALL BE CONSISTENT THROUGHOUT INCLUDING CONDUCTORS INSTALLED IN RACEWAYS AND IN ALL CABLE ASSEMBLIES (MC AND/OR AC). FLEXIBLE METAL CLAD (MC) CABLE SHALL BE UL LISTED WITH INSULATED THHN PHASE AND GROUND CONDUCTORS WITHIN A GALVANIZED STEEL OR ALUMINUM INTERLOCKING ARMOR.

4. SAFETY DISCONNECT SWITCHES: DISCONNECT SWITCHES SHALL BE THREE–POLE HEAVY DUTY TYPE RATED FOR 600 VOLT IN NEMA 1 (INTERIOR DRY APPLICATIONS) AND NEMA 3R (EXTERIOR APPLICATIONS) ENCLOSURES UNLESS NOTED OTHERWISE ON THE DRAWINGS. ALL SWITCHES SHALL BE HORSEPOWER RATED AND SUITABLE FOR SERVICE ENTRANCE USE WHERE INDICATED ON THE DRAWINGS. PROVIDE WITH SOLID NEUTRAL WHERE FOUR WIRE CIRCUITS ARE ILLUSTRATED. MANUAL MOTOR STARTERS SHALL HAVE QUICK MAKE, QUICK BREAK TOGGLE MECHANISMS WITH ALLOWANCE FOR UP TO 10% FIELD ADJUSTMENT TO NOMINAL OVERLOAD HEATER VALUES. MANUAL MOTOR STARTERS SHALL BE SINGLE PHASE AND MAY BE USED FOR APPLICATIONS UP TO 1 HP AT 277 VOLT. ACCEPTABLE MANUFACTURERS SHALL BE SQUARE D, GE, SIEMENS OR EATON CUTLER–HAMMER.

5. PANELBOARDS: PANELBOARDS SHALL BE CIRCUIT BREAKER TYPE WITH THERMAL MAGNETIC BOLT–ON MOLDED CASE CIRCUIT BREAKERS AND COPPER BUSSES. MINIMUM INTERRUPTING CAPACITY SHALL BE 10,000 AMPS SYMMETRICAL AT 208 VOLT. REFER TO PANEL SCHEDULES FOR EXACT AIC RATINGS OF EQUIPMENT. PANELBOARD COVERS SHALL BE DOOR–IN–DOOR DESIGN UP TO AND INCLUDING 400A. ACCEPTABLE MANUFACTURERS SHALL BE SQUARE D, GE, SIEMENS OR EATON CUTLER–HAMMER.

7. PANELBOARDS: PANELBOARDS SHALL BE CIRCUIT BREAKER TYPE WITH THERMAL MAGNETIC BOLT–ON MOLDED CASE CIRCUIT BREAKERS AND COPPER BUSSES. MINIMUM INTERRUPTING CAPACITY SHALL BE 10,000 AMPS SYMMETRICAL AT 208 VOLT. REFER TO PANEL SCHEDULES FOR EXACT AIC RATINGS OF EQUIPMENT. PANELBOARD COVERS SHALL BE DOOR–IN–DOOR DESIGN UP TO AND INCLUDING 400A. ACCEPTABLE MANUFACTURERS SHALL BE SQUARE D, GE, SIEMENS OR EATON CUTLER–HAMMER.

8. CHECK METERING: PROVIDE ELECTRONIC KWH/KWD METERING WITH DIGITAL LCD DISPLAY AS INDICATED ON THE DRAWINGS. METERS SHALL BE ENCLOSED IN HEAVY DUTY ENCLOSURE WITH A METHOD OF LOCKING TO PREVENT UNAUTHORIZED ACCESS. METERS SHALL BE UL LISTED, CSA APPROVED AND CERTIFIED BY A NATIONALLY RECOGNIZED INDEPENDENT TEST FACILITY TO ANSI C12.1 AND C12.16 SPECIFICATIONS. DEMAND DISPLAY WILL SHOW THE HIGHEST PEAK DEMAND. METERS SHALL BE PROVIDED WITH SELF CONTAINED BACKUP SYSTEM TO MAINTAIN THE MEMORY AND DISPLAY DURING POWER FAILURES. CURRENT SENSORS/CTS SHALL BE SPLIT CORE CONFIGURATION. SENSORS SHALL BE SIZED TO MATCH THE APPLICATION CIRCUIT RATING AMPS. METERS SHALL BE TESTED TO ANSI C12.1 AND C12.16.

9. DRY TYPE TRANSFORMERS: DRY TYPE TRANSFORMERS SHALL MEET NEMA ST20 AND TP–1 AND UL STANDARDS. TRANSFORMERS SHALL HAVE 220°C., INSULATION SYSTEM RATED FOR CONTINUOUS OPERATION AT RATED KVA. TRANSFORMERS TEMPERATURE RISE SHALL NOT EXCEED 150°C. COILS SHALL BE CONTINUOUS WOUND CONSTRUCTION OF COPPER OR ALUMINUM. TRANSFORMER PRIMARY SHALL BE PROVIDED WITH (6) 2.5% TAPS. K13 RATED TRANSFORMERS SHALL HAVE 200% NEUTRALS AND AN ELECTROSTATIC SHIELD WITH NOISE ATTENUATION OF 120db COMMON MODE AND 30db NORMAL MODE. ACCEPTABLE MANUFACTURERS SHALL BE SQUARE D, GE, SIEMENS OR EATON CUTLER–HAMMER.

10. GENERATOR: DIESEL GENERATOR RATED 150KW, 208/120V, 3PH, 4W REFER TO DRAWING E0.02 SPECIFICATIONS FOR ADDITIONAL INFORMATION.

PART 3 EXECUTION

1. GENERAL: ALL INTERRUPTIONS AND SHUTDOWNS OF EXISTING ELECTRICAL SYSTEMS AND SERVICES SHALL BE AS SHORT AS POSSIBLE AND AT A TIME AND DURATION APPROVED BY THE OWNER AND ENGINEER. THE CONTRACTOR SHALL INCLUDE ALL PREMIUM TIME ASSOCIATED WITH THE SYSTEM AND SERVICE INTERRUPTIONS AND SHUTDOWNS.

2. IDENTIFICATION: FURNISH AND INSTALL NAMEPLATES ON ALL ELECTRICAL EQUIPMENT INCLUDING PANELS, JUNCTION BOXES, DISCONNECT SWITCHES, TRANSFORMERS AND STARTERS.

3. RACEWAYS AND CONDUIT: REFER TO POWER, LIGHTING AND FIRE ALARM DRAWINGS FOR ALLOWABLE WIRING METHODS. EMT MAY BE USED WITH SET SCREW FITTINGS IN CONCEALED AND EXPOSED LOCATIONS WHERE NOT EXPOSED TO PHYSICAL DAMAGE OR MOISTURE. USE RIGID GALVANIZED STEEL WITH THREADED FITTINGS WHERE EMT PROHIBITED. ALL RACEWAYS, WHICH PASS THROUGH BUILDING EXPANSION JOINTS, SHALL BE EQUIPPED WITH EXPANSION FITTINGS. ALL CONDUITS SHALL BE SUPPORTED IN AN APPROVED MANNER TO THE BUILDING STRUCTURE. SUPPORT FROM CONDUITS, DUCTWORK, PIPING, ETC. WILL NOT BE PERMITTED. RACEWAYS SHALL BE RUN CONCEALED UNLESS NOTED OTHERWISE, PERPENDICULAR AND/OR PARALLEL TO THE BUILDING STRUCTURE. NECA STANDARDS SHALL DEFINE MINIMUM QUALITY LEVEL FOR INSTALLATION WHERE APPLICABLE.

4. WIRE AND CABLE: BRANCH CIRCUIT WIRING IS NOT ILLUSTRATED ON THE DRAWINGS. PROVIDE COMPLETE WIRING SYSTEM TO MEET ILLUSTRATED INTENT. CONDUIT HOMERUNS SHOWN ON THE DRAWINGS WITH MORE THAN 3 CURRENT CARRYING CONDUCTORS ARE SHOWN DIAGRAMMATICALLY. THE INSTALLATION OF MORE THAN 3 CURRENT CARRYING CONDUCTORS IN A COMMON RACEWAY SHALL REQUIRE THE DERATING OF ALL ASSOCIATED CONDUCTORS. ALL CIRCUITS SHALL CONTAIN A FULL SIZE, INSULATED GROUND CONDUCTOR.

5. WIRING DEVICES AND PLATES: ALL DEVICES OTHER THAN 20A 120V SHALL BE CLEARLY LABELED WITH PERMANENTLY APPLIED NAMEPLATES (OR ENGRAVED FACEPLATES) DETAILING THE VOLTAGE CHARACTERISTICS AND CIRCUIT NUMBER.

6. SAFETY DISCONNECT SWITCHES: FUSES SHALL BE CLASS RK–1 SIZED PER DRAWING AND NAMEPLATE REQUIREMENTS. INSTALL REJECTION CLIPS TO PROHIBIT INSTALLATION OF OTHER THAN CURRENT LIMITING FUSES.

7. PANELBOARDS: THE CONTRACTOR SHALL BALANCE PANELBOARD LOADS TO WITHIN 10% PHASE TO PHASE. PROVIDE NEW AND OR UPDATED TYPEWRITTEN DIRECTORIES OF BRANCH CIRCUITS IN ALL PANELBOARDS, NEW AND EXISTING, WHICH ARE MODIFIED UNDER THIS CONTRACT. INDICATE CIRCUIT CHANGES IN AS–BUILT RECORD DRAWINGS.

8. DRY TYPE TRANSFORMERS: PROVIDE VIBRATION ISOLATION TO PROHIBIT THE TRANSMISSION OF VIBRATION TO THE STRUCTURE. TRANSFORMER SHALL BE PLACED ON ISOLATORS (PAD OR SPRING) AND ALL ELECTRICAL CONNECTIONS SHALL BE MADE WITH 12" TO 18" LENGTHS OF FLEXIBLE METAL CONDUIT.

9. LIGHTING: ALL LIGHT FIXTURES SHALL BE SUPPORTED IN AN APPROVED MANNER TO THE BUILDING STRUCTURE WITH A MINIMUM OF TWO SAFETY CHAINS, CONNECTED AT OPPOSITE ENDS OF THE FIXTURE. SUPPORT FROM CONDUITS, DUCTWORK, PIPING, ETC. WILL NOT BE PERMITTED.

10. EQUIPMENT TESTING AND CLEANING:

    CLEAN THE INTERIOR AND EXTERIOR OF ALL EQUIPMENT AT PROJECT COMPLETION OF ALL CONSTRUCTION DEBRIS AND RESIDUE. DAMAGED SURFACES SHALL BE REPAIRED AND FINISHES TOUCHED UP PAINT TO MATCH THE MANUFACTURER'S FINISH. EXTENSIVELY DAMAGED ENCLOSURES SHALL BE REPLACED.

    TEST THE INSULATION RESISTANCE BETWEEN EACH PHASE AND GROUND OF ALL FEEDERS ILLUSTRATED ON THE ONE LINE DIAGRAM. PROVIDE A TEST REPORT INDICATING THE RESULTS. REPLACE ALL CONDUCTORS THAT FAIL TO COMPLY WITH NETA TESTING STANDARDS.

    VERIFY VOLTAGE AT THE ASSOCIATED PANELBOARD UNDER LOAD AND ADJUST TAP SETTINGS AS REQUIRED TO DELIVER NOMINAL VOLTAGE DURING NORMAL AND LIGHTLY LOADED CONDITIONS.

11. GENERATOR: DIESEL GENERATOR RATED 150KW, 208/120V, 3PH, 4W REFER TO BOOK SPECIFICATIONS FOR ADDITIONAL INFORMATION.

BID DOCUMENTS
01-23-2012

RDK ENGINEERS

Andover, MA - Boston, MA - Amherst, MA
Durham, NC - Charlotte, NC

RDK Engineers
200 Brickstone Square
Andover, MA 01810-1488

T.978-475-0298
F.978-475-5768
W. www.rdkengineers.com

REVISIONS

DATE	CHK	DESCRIPTION

SEAL

PROJECT
NUMBER 20100320.00
DATE 01-23-2012

NEWTON PUBLIC SCHOOL EDUCATIONAL CENTER SCHOOL GENERATOR UPGRADE
NEWTON, MA 02459

DRAWING
DRAWN BY KVM
CHECKED BY SG
SCALE NONE

ELECTRICAL SPECIFICATIONS

E0.01

ELECTRICAL SPECIFICATIONS

PART 2 – PRODUCTS

STANDBY DIESEL ELECTRIC GENERATING SYSTEM

A. GENERAL

1. PROVIDE DIESEL ENGINE–DRIVEN ELECTRIC GENERATING SYSTEM RATED FOR EMERGENCY STANDBY SERVICE. THE AUTOMATIC TRANSFER SWITCH(ES) SPECIFIED IN OTHER SECTIONS OF THIS SPECIFICATION SHALL BE SUPPLIED BY THE GENERATOR SET MANUFACTURER IN ORDER TO ESTABLISH AND MAINTAIN A SINGLE SOURCE OF SYSTEM RESPONSIBILITY AND COORDINATION. REFER TO THE DRAWINGS FOR SERVICE RATINGS AT 60 HZ.
2. THE SYSTEM SHALL AUTOMATICALLY START AND ACCEPT FULL RATED LOAD WITHIN TEN (10) SECONDS OF BEING SIGNALED TO START.
3. ENGINE GENERATOR AND ACCESSORIES INCLUDING CONTROL PANEL, ENGINE STARTING BATTERIES AND OUTPUT CIRCUIT BREAKER(S) SHALL BE MOUNTED WITHIN A SOUND ATTENUATED WEATHERPROOF ENCLOSURE. REFER TO THE ENCLOSURE SPECIFICATION SECTION FOR ADDITIONAL DETAILS.
4. SPECIFIED KW IS FOR CONTINUOUS SERVICE DURING UTILITY SOURCE INTERRUPTION, AS ESTABLISHED IN ISO 8528–3 AT 86°F. RATING SHALL BE SUBSTANTIATED BY MANUFACTURER'S STANDARD PUBLISHED CURVES. SPECIAL AND MAXIMUM RATINGS WILL NOT BE ACCEPTED.
   - 150KW/187.5KVA, 208V, 3PH
5. SUPPLIER SHALL HAVE BEEN ENGAGED REGULARLY IN GENERATOR OR ENGINE MANUFACTURE, OR BOTH, FOR AT LEAST TWENTY–FIVE YEARS. THE GENERATOR MANUFACTURER AND DEALER SHALL BE ISO 9002 CERTIFIED.
6. THE SUPPLIER SHALL MAINTAIN A FULL TIME IN–HOUSE PARTS AND SERVICE ORGANIZATION SO THAT PARTS AND SERVICE ARE READILY AVAILABLE, 24–HOURS/DAY 7–DAYS/WEEK. QUALIFIED, FACTORY TRAINED SERVICE PERSONNEL SHALL BE AVAILABLE WITHIN 4 HOURS OF NOTIFICATION.
7. PROTOTYPE TESTING SHALL CERTIFY THE ACCEPTABLE PERFORMANCE OF THE GENERATING SET SERIES. THE TEST SHALL PROVE ACCEPTANCE, AS A SYSTEM, OF THE DESIGN AND INTEGRATION OF ALL COMPONENTS. PROPOSED SYSTEM SHALL BE A CURRENT FACTORY PRODUCTION MODEL. PROTOTYPE TESTING SHALL CONFIRM:
   a. FUEL CONSUMPTION AT ¼, ½, ¾ AND FULL LOAD.
   b. EXHAUST EMISSIONS.
   c. MECHANICAL AND EXHAUST NOISE LEVELS.
   d. GOVERNOR SPEED REGULATION AT ¼, ½, ¾ AND FULL LOAD.
   e. GENERATOR TEMPERATURE RISE IN ACCORDANCE WITH NEMA MG1–22.40
   f. HARMONIC ANALYSIS, VOLTAGE WAVEFORM DEVIATION AND TELEPHONE INFLUENCE FACTOR.
   g. GENERATOR SHORT CIRCUIT CAPACITY.
   h. COOLING SYSTEM CAPACITY.
8. PROVIDE MANUFACTURER'S LOAD ANALYSIS CALCULATION CONFIRMING THAT THE GENERATING SET SUBMITTED IS COMPATIBLE WITH LOADS TO BE APPLIED.
9. THE PROPOSED GENERATOR SET SHALL BE EPA TIER 3 CERTIFIED AND IN COMPLIANCE WITH THE NEW JERSEY EMISSION REGULATIONS AT THE TIME OF INSTALLATION/COMMISSIONING. ACTUAL ENGINE EMISSIONS VALUES MUST BE IN COMPLIANCE WITH EPA TIER 3 EMISSIONS STANDARDS PER ISO 8178 – D2 EMISSIONS CYCLE AT SPECIFIED EKW/BHP RATING. UTILIZATION OF THE "TRANSITION PROGRAM FOR EQUIPMENT MANUFACTURERS" ALSO KNOWN AT "FLEX CREDITS" TO ACHIEVE TIER CERTIFICATION IS NOT IN COMPLIANCE WITH MA REGULATION "310 CMR 7.02 U PLAN APPROVAL AND EMISSION LIMITATIONS" AND WILL NOT BE ACCEPTED
10. THE MANUFACTURER'S WARRANTEE SHALL BE FOR A MINIMUM PERIOD OF FIVE (5) YEARS FROM THE DATE OF INITIAL SYSTEM START–UP AND ACCEPTANCE OR 1500 OPERATING HOURS, WHICHEVER OCCURS FIRST. THE WARRANTEE SHALL INCLUDE REPAIR PARTS, EXPENDABLES (LUBRICATING OIL, FILTERS, ANTIFREEZE, ETC.), LABOR AND TRAVEL EXPENSES NECESSARY FOR REPAIRS AT THE JOB SITE. THE SUPPLIER SHALL PROVIDE A TRAILER MOUNTED PORTABLE ENGINE GENERATOR WITH ACCESSORIES (INCLUDING INTERCONNECTION TO THE ELECTRICAL DISTRIBUTION SYSTEM) TO PROVIDE BACKUP POWER FOR ANY WARRANTEE RELATED SYSTEM OUTAGES THAT EXCEED FIVE CALENDAR DAYS.
11. ENGINE DRIVEN ELECTRICAL GENERATING SYSTEMS SHALL BE AS MANUFACTURED BY CATERPILLAR, CUMMINS , GENERAC OR KOHLER.

B. ENGINE

1. THE ENGINE SHALL BE DIESEL FUELED, FOUR (4) CYCLE, WATER–COOLED, EITHER VERTICAL IN–LINE OR V–TYPE, WITH DRY EXHAUST MANIFOLDS, OPERATING WITH NOMINAL SPEED NOT EXCEEDING 1800 RPM. IT SHALL HAVE 6 CYLINDERS WITH A MINIMUM CUBIC INCH DISPLACEMENT OF 404.
2. FREQUENCY REGULATION SHALL BE ISOCHRONOUS, REGULATED TO WITHIN +/– 0.25% FROM NO LOAD TO FULL LOAD.
3. ALL FUEL PIPING SHALL BE BLACK IRON OR FLEXIBLE FUEL HOSE RATED FOR THIS SERVICE. FLEXIBLE FUEL LINES RATED 300°F AND 100 PSI.
4. THE ENGINE SHALL BE EQUIPPED WITH A RAIL–MOUNTED, ENGINE–DRIVEN RADIATOR WITH BLOWER FAN AND ALL ACCESSORIES. THE COOLING SYSTEM SHALL BE SIZED TO OPERATE AT FULL LOAD CONDITIONS, 110°F AMBIENT AIR ENTERING THE ROOM OR ENCLOSURE (WHERE AN ENCLOSURE IS SPECIFIED), AND PERMANENT ANTI–FREEZE SOLUTION TO PROTECT EQUIPMENT TO –15°F WITHOUT DERATING THE UNIT. ANTIFREEZE SHALL HAVE A SERVICE LIFE OF 3000 HOURS WITHOUT MAINTENANCE. THE GENERATOR SET SUPPLIER IS RESPONSIBLE FOR PROVIDING A PROPERLY SIZED COOLING SYSTEM BASED ON THE INSTALLED STATIC PRESSURE RESTRICTION.
5. PROVIDE THERMOSTATICALLY–CONTROLLED ENGINE JACKET WATER HEATER, BE SIZED BY THE MANUFACTURER TO MAINTAIN JACKET WATER TEMPERATURE AT 90°F, 208 V, SINGLE–PHASE, 60 HZ MOUNTED, PIPED AND PREWIRED TO TERMINAL STRIP.
6. LUBE OIL PUMP SHALL BE MECHANICALLY DRIVEN POSITIVE DISPLACEMENT. LUBE OIL SYSTEM SHALL BE PIPED THROUGH AN OIL COOLER AND A FULL FLOW FILTER WITH REPLACEABLE CARTRIDGE.
7. FUEL OIL PUMP SHALL BE MECHANICALLY DRIVEN POSITIVE DISPLACEMENT WITH FULL FLOW FILTER AND REPLACEABLE CARTRIDGE. FUEL SYSTEM SHALL HAVE A MANUAL–PRIMING PUMP. FUEL PIPING SHALL BE ARRANGED TO PROHIBIT LOSS OF PRIME WITH AN ANTI–SIPHON CHECK VALVE AT THE FUEL PUMP SUCTION PIPING.
8. AIR INTAKE SHALL BE VIA REPLACEABLE DRY ELEMENT FILTER.
9. PROVIDE LUBRICATING OIL PRESSURE GAUGE, WATER TEMPERATURE GAUGE, BATTERY CHARGE RATE AMMETER AND RUNNING TIME METER MOUNTED IN COMMON PANEL WITH ENGINE CONTROLS, ALTERNATOR CONTROLS AND ALTERNATOR INSTRUMENTS.
10. A CRITICAL TYPE SILENCER, COMPANION FLANGES, AND FLEXIBLE STAINLESS STEEL EXHAUST FITTING PROPERLY SIZED SHALL BE FURNISHED AND INSTALLED ACCORDING TO THE MANUFACTURER'S RECOMMENDATION. EXHAUST PIPE SIZE SHALL BE SUFFICIENT TO ENSURE THAT EXHAUST BACK PRESSURE DOES NOT EXCEED THE MAXIMUM LIMITATIONS SPECIFIED BY THE ENGINE MANUFACTURER. THE SILENCER SHALL BE MOUNTED SO THAT ITS WEIGHT IS NOT SUPPORTED BY THE ENGINE NOR WILL EXHAUST SYSTEM GROWTH DUE TO THERMAL EXPANSION BE IMPOSED ON THE ENGINE. THE MUFFLER AND ALL INDOOR EXHAUST PIPING SHALL BE "LAGGED" BY THE CONTRACTOR TO MAINTAIN A SURFACE TEMPERATURE NOT TO EXCEED 150F. THE INSULATION SHALL BE INSTALLED SO THAT IT DOES NOT INTERFERE WITH THE FUNCTIONING OF THE FLEXIBLE EXHAUST FITTING.
11. PACKAGED GENERATOR SET SHALL BE CERTIFIED AND IN COMPLIANCE WITH THE LATEST NON–ROAD, OFF–HIGHWAY EPA AND CARB EMISSION REGULATIONS.

C. ALTERNATOR

1. THE SYNCHRONOUS GENERATOR SHALL BE A SINGLE BEARING, SELF–VENTILATED, DRIP–PROOF DESIGN IN ACCORDANCE WITH NEMA MG 1 AND DIRECTLY CONNECTED TO THE ENGINE FLYWHEEL HOUSING WITH A FLEX COUPLING TO ENSURE PERMANENT ALIGNMENT. THE INSULATION MATERIAL SHALL MEET NEMA STANDARDS FOR CLASS H INSULATION AND BE IMPREGNATED IN A POLYESTER VARNISH OR VACUUM IMPREGNATED WITH EPOXY VARNISH TO BE FUNGUS RESISTANT. TEMPERATURE RISE OF THE ROTOR AND STATOR SHALL NOT EXCEED NEMA CLASS F (130 °C RISE BY RESISTANCE OVER 40°C AMBIENT).
2. THE EXCITATION SYSTEM SHALL BE OF BRUSHLESS CONSTRUCTION. THE BRUSHLESS EXCITER SHALL BE INDEPENDENT OF MAIN STATOR WINDINGS (EITHER PERMANENT MAGNET OR AUXILIARY WINDINGS) SHALL CONSIST OF A THREE–PHASE ARMATURE AND A THREE–PHASE FULL WAVE BRIDGE RECTIFIER MOUNTED ON THE ROTOR SHAFT. SURGE SUPPRESSORS SHALL BE INCLUDED TO PROTECT THE DIODES FROM VOLTAGE SPIKES. GENERATOR SHALL HAVE THE ABILITY TO SUSTAIN SHORT CIRCUIT CURRENT OF 300% OF RATED CURRENT TO ALLOW PROTECTIVE DEVICES TO OPERATE.
3. THE AUTOMATIC VOLTAGE REGULATOR (AVR) SHALL MAINTAIN GENERATOR OUTPUT VOLTAGE WITHIN +/– 0.5% FOR ANY CONSTANT LOAD BETWEEN NO LOAD AND FULL LOAD. THE REGULATOR SHALL BE THREE PHASE SENSING, TOTALLY SOLID STATE DESIGN , WHICH INCLUDES ELECTRONIC VOLTAGE BUILDUP, VOLTS PER HERTZ REGULATION, OVER EXCITATION PROTECTION, LOSS OF SENSING PROTECTION, TEMPERATURE COMPENSATION, SHALL LIMIT VOLTAGE OVERSHOOT ON STARTUP, AND SHALL BE ENVIRONMENTALLY SEALED. SYSTEM SHALL REDUCE VOLTAGE AUTOMATICALLY IF LOAD DEMAND EXCEEDS ENGINE CAPACITY AND REMOVE EXCITATION WHEN GENERATOR IS OVERLOADED FOR MORE THAN 10 SECONDS. VOLTAGE REGULATOR SHALL BE, VOLTS–PER–HERTZ AND INCLUDE OVER VOLTAGE AND UNDER VOLTAGE PROTECTION.
4. THE ALTERNATOR OUTPUT SHALL BE WIRED VIA A GENERATOR MOUNTED 3 POLE MOLDED CASE CIRCUIT BREAKER, TRIP RATING AS INDICATED ON THE DRAWINGS. BREAKER SHALL UTILIZE AN ELECTRONIC LSI SOLID STATE TRIP. UNIT BREAKER SHALL BE HOUSED IN A STEEL NEMA 1 ENCLOSURE MOUNTED ON A SEPARATE SUPPORT STAND VIBRATION ISOLATED FROM THE ENGINE / GENERATOR ARRANGEMENT. BUS BARS, SIZED FOR THE CABLE TYPE SHOWN ON DRAWING, SHALL BE SUPPLIED ON THE LOAD SIDE OF BREAKER.

D. PROVIDE SPRING VIBRATION MOUNTS BETWEEN ENGINE GENERATOR SET AND STRUCTURAL SUB–BASE AS RECOMMENDED BY EQUIPMENT MANUFACTURER. UNIT SHALL BE SUITABLE FOR INSTALLATION ON ANY LEVEL SURFACE.

E. STARTING

1. A DC ELECTRIC STARTING SYSTEM WITH POSITIVE ENGAGEMENT SHALL BE FURNISHED. THE MOTOR VOLTAGE SHALL BE AS RECOMMENDED BY THE ENGINE MANUFACTURER.
2. PROVIDE 24 V LEAD ACID BATTERIES AS RECOMMENDED BY EQUIPMENT MANUFACTURER, NO LESS THAN 225 A–HOUR CAPACITY. PROVIDE UNIT MOUNTED BATTERY RACK, HOLD DOWN AND BATTERY CABLES.
3. A CURRENT LIMITING BATTERY CHARGER SHALL BE FURNISHED TO AUTOMATICALLY RECHARGE BATTERIES EQUAL TO LAMARCHE MODEL A46–20–24V. CHARGER SHALL FLOAT AT 2.17 VOLTS PER CELL AND EQUALIZE AT 2.33 VOLTS PER CELL. IT SHALL INCLUDE OVERLOAD PROTECTION, SILICON DIODE FULL WAVE RECTIFIERS, VOLTAGE SURGE SUPPRESSOR, DC AMMETER, DC VOLTMETER, AND FUSED AC INPUT. AC INPUT VOLTAGE SHALL BE 120 VOLTS, SINGLE PHASE. PROVIDE 0– TO 24–HOUR EQUALIZING TIMER AND LOW AND HIGH DC VOLTAGE ALARM RELAYS.
4. PROVIDE BATTERY BLANKET HEATER TO MAINTAIN BATTERY TEMPERATURE BETWEEN 50F AND 90F.

F. PROVIDE A GENERATOR SET MOUNTED CONTROL PANEL FOR COMPLETE CONTROL AND MONITORING OF THE ENGINE AND GENERATOR SET FUNCTIONS. PANEL SHALL INCLUDE AUTOMATIC START/STOP OPERATION, CYCLE CRANKING, AC METERING (0.5% TRUE RMS ACCURACY) WITH PHASE SELECTOR SWITCH, SHUTDOWN SENSORS AND ALARMS WITH HORN AND RESET, ADJUSTABLE COOL–DOWN TIMER AND EMERGENCY STOP PUSH–BUTTON AND ENGINE RUN TIME METER (NON–RESETTABLE).

1. CRITICAL COMPONENTS SHALL BE ENVIRONMENTALLY SEALED TO PROTECT AGAINST FAILURE FROM MOISTURE AND DIRT. COMPONENTS SHALL BE HOUSED IN A NEMA 1/IP22 ENCLOSURE WITH HINGED DOOR.
2. THE PANEL ITSELF SHALL BE MOUNTED ON A SEPARATE SUPPORT STAND ISOLATED FROM THE ENGINE / GENERATOR ARRANGEMENT. PANEL / BREAKER ARRANGEMENTS MOUNTED ON THE GENERATOR SET IN SUCH A WAY THAT ACCESS TO THE AC GENERATOR TERMINAL BOX IS RESTRICTED IN ANY WAY WHATSOEVER ARE NOT ACCEPTABLE.
3. PROVIDE THE FOLLOWING READOUTS:
   a. ENGINE OIL PRESSURE
   b. COOLANT TEMPERATURE
   c. ENGINE RPM
   d. SYSTEM DC VOLTS
   e. ENGINE RUNNING HOURS
   f. GENERATOR AC VOLTS
   g. GENERATOR FREQUENCY
   h. GENERATOR AC AMPS
4. PROVIDE THE FOLLOWING INDICATIONS FOR PROTECTION AND DIAGNOSTICS ACCORDING TO NFPA 110 LEVEL 1:
   a. LOW OIL PRESSURE
   b. HIGH WATER TEMPERATURE
   c. LOW COOLANT LEVEL
   d. OVERSPEED
   e. OVERCRANK
   f. EMERGENCY STOP DEPRESSED
   g. APPROACHING HIGH COOLANT TEMPERATURE
   h. APPROACHING LOW OIL PRESSURE
   i. LOW COOLANT TEMPERATURE
   j. LOW VOLTAGE IN BATTERY
   k. CONTROL SWITCH NOT IN AUTO POSITION
   l. LOW FUEL MAIN TANK
   m. BATTERY CHARGER AC FAILURE
   n. HIGH BATTERY VOLTAGE
   o. FUEL TANK RUPTURE
   p. ONE (1) SPARE POINT

   DIAGNOSTICS CAPABILITIES SHALL IDENTIFYING BOTH SYSTEM AND COMPONENT LEVEL ISSUES. THE DIAGNOSTIC CODES SHALL BE MAINTAINED IN A HISTORY LOG SPECIFYING THE NUMBER OF OCCURRENCES, AND SECOND/MINUTE/HR AT WHICH THEY OCCUR.
5. PROVIDE THE FOLLOWING CONTROL FUNCTIONS:
   a. TERMINALS LOCATED INSIDE THE CONTROL PANEL FOR REMOTE EMERGENCY STOP
   b. ON / OFF / AUTO CONTROL SWITCH
6. PROVIDE A MINIMUM OF 4 PROGRAMMABLE OUTPUT DRY CONTACTS FOR CONNECTION TO THE OWNER'S SECURITY OR ATC SYSTEM. THREE OF THE 4 OUTPUTS SHALL BE PROGRAMMED TO ALARM "ENERGY RUNNING", "SUMMARY ALARM" AND "GENERATOR NOT IN AUTOMATIC".

G. PROVIDE A REMOTE SURFACE MOUNTED ANNUNCIATOR TO MEET THE REQUIREMENTS OF NFPA 110, LEVEL 1, INSTALLED IN ENCLOSURE SUITABLE FOR SURFACE

MOUNTING. THE ANNUNCIATOR SHALL PROVIDE REMOTE ANNUNCIATION OF ALL POINTS STATED ABOVE AND SHALL INCORPORATE RING–BACK CAPABILITY SO THAT AFTER SILENCING THE INITIAL ALARM, ANY SUBSEQUENT ALARMS WILL SOUND THE HORN.

H. SOUND ATTENUATED WEATHERPROOF ENCLOSURE.

1. ENGINE GENERATOR SET, GENERATOR CONTROL PANEL, ENGINE STARTING BATTERIES AND INTERNALLY MOUNTED EXHAUST SILENCER SHALL BE ENCLOSED IN FACTORY–ASSEMBLED, RAINPROOF–WEATHER–PROTECTIVE SKID–BASE ENCLOSURE WITH FULL FLOOR PANEL. THE ENCLOSURE SHALL HAVE A RESULTING SOUND LEVEL OF LESS THAN 71 DBA AT 50 FEET. THE ENCLOSURE AND GENERATOR SHALL BE UL2200 LABELED.
2. ENCLOSURE WILL CONSIST OF A ROOF, FUEL TANK AND RUPTURE BASIN BASE, TWO (2) SIDE WALLS, AND TWO (2) END WALLS, OF HIGHLY CORROSION RESISTANT CONSTRUCTION MADE FROM GALVANIZED STEEL. STAINLESS STEEL FLUSH FITTING LATCHES AND HINGES TESTED AND PROVEN TO WITHSTAND EXTREME CONDITIONS OF CORROSION. THE SHEET STEEL COMPONENTS SHALL BE PRE–TESTED WITH ZINC PHOSPHATE PRIOR TO POLYESTER POWDER COATING AT 392 DEGREES F. ROOF BOWS SHALL BE CAMBERED TO AID IN RAIN RUNOFF.
3. AN INTEGRAL FUEL TANK UNDERFRAME AND RUPTURE BASIN SHALL BE SUPPLIED, CONSISTING OF THE FOLLOWING:
   a. A RUPTURE BASIN UTILIZING MINIMUM 7 GA. STEEL CHANNEL PERIMETER WALLS AND BOTTOM.
   b. A U.L. LISTED (PER U.L. 142) ABOVE–GROUND 24–HOUR, 284 GALLON CAPACITY RECTANGULAR TANK OF MINIMUM 12 GA. STEEL CONSTRUCTION.
   c. THE TANK SHALL HAVE VENTING AND EMERGENCY VENTING (TO ROOF) PER U.L. 142, LOCKABLE FILL, LOW LEVEL AND HIGH LEVEL ALARM CONTACTS, AND A D.D. ELECTRIC ANALOG LEVEL GAUGE.
   d. THE FILL VALVE SHALL HAVE AN OVERFILL PREVENTION TYPE, EQUAL TO THE "STOPPER" OPW 61F STOP.
   e. THE RUPTURE BASIN SHALL HAVE A FLOAT CONTACT TO INDICATE TANK RUPTURE.
   f. THE ENTIRE SYSTEM SHALL BE LEAK TESTED PRIOR TO INSTALLATION.
4. INTAKE OPENINGS SHALL BE SCREENED TO PREVENT THE ENTRANCE OF RODENTS. THE SYSTEM SHALL INCLUDE A COOLING AND COMBUSTION AIR INLET SILENCER SYSTEM, AN EQUIPMENT ENCLOSURE SECTION, AND A COOLING AIR DISCHARGE SILENCER SECTION.
5. NUMBER OF DOORS ON ENCLOSURE SHALL BE AS REQUIRED SO THAT ALL NORMAL MAINTENANCE OPERATIONS, SUCH AS LUBE OIL CHANGE, FILTER CHANGE, BELT ADJUSTMENT AND REPLACEMENTS, HOSE REPLACEMENTS, ACCESS TO THE CONTROL PANELS, ETC., MAY BE ACCOMPLISHED WITHOUT DISASSEMBLY OF ANY ENCLOSURE COMPONENTS. ACCESS DOORS SHALL BE FABRICATED OF THE SAME MATERIAL AS THE ENCLOSURE WALLS. THEY SHALL BE REINFORCED FOR RIGIDITY AND SET IS A WELDED FRAME TO ENSURE PROPER OPERATION. HANDLES SHALL BE KEY LOCKABLE, ALL DOORS KEYED ALIKE, AND HINGES SHALL BE ZINC DIE CAST OR STAINLESS STEEL. FASTENERS SHALL BE ZINC PLATED OR STAINLESS STEEL. DOORS SHALL BE OF A LIFT OFF DESIGN ALLOWING ONE PERSON TO REMOVE DOOR IF NECESSARY AND/OR TOP HUNG AND SUPPORTED BY GAS STRUTS.
6. BATTERY RACKS AND BATTERIES SHALL BE FACTORY–INSTALLED AND WIRED. EXHAUST SILENCER, FLEXIBLE EXHAUST CONNECTOR AND CONDENSATE DRAIN VALVE SHALL BE FACTORY–INSTALLED.
7. LUBE OIL AND COOLANT DRAINS SHALL BE EXTENDED TO THE EXTERIOR OF THE ENCLOSURE AND TERMINATED WITH DRAIN VALVES AND CAPPED WITH PIPE NIPPLES ON FLANGED CONNECTORS. RADIATOR ACCESS SHALL BE THROUGH A HINGED, LOCKABLE COVER ON ENCLOSURE. COOLING FAN AND CHARGING ALTERNATOR SHALL BE FULLY GUARDED TO PREVENT INJURY.
8. OWNER SHALL SELECT FINISH COLOR OF ENCLOSURE.
9. THE EXHAUST STACK SHALL BE A MINIMUM OF 10' 0" ABOVE THE ENCLOSURE ROOF. ALL REQUIRED SUPPORTS SHALL BE ATTACHED TO THE ENCLOSURE. NO OBSTRUCTIONS SHALL BE ALLOWED TO THE EXHAUST OUTLET.
10. PROVIDE A MANUAL STOP BREAK–GLASS STATION TO ALLOW EMERGENCY SHUTDOWN OF THE UNIT. THE STATION SHALL BE INTEGRATED INTO THE ENCLOSURE AND ACCESSIBLE FROM THE EXTERIOR, NO GREATER THAN 6'0" AFG.
11. THE EXHAUST STACK SHALL BE A MINIMUM OF 10' 0" ABOVE THE ENCLOSURE ROOF. ALL REQUIRED SUPPORTS SHALL BE ATTACHED TO THE ENCLOSURE. NO OBSTRUCTIONS SHALL BE ALLOWED TO THE EXHAUST OUTLET.

I. SUBMITTALS

1. THE MANUFACTURER SHALL PROVIDE COPIES OF FOLLOWING DOCUMENTS TO THE OWNER FOR REVIEW AND EVALUATION IN ACCORDANCE WITH GENERAL REQUIREMENTS OF DIVISION 1 AND DIVISION 16:
   a. FACTORY PUBLISHED SPECIFICATION SHEET INDICATING STANDARD AND OPTIONAL ACCESSORIES, RATINGS, ETC. WEIGHTS OF ALL EQUIPMENT SHALL BE HIGHLIGHTED.
   b. MANUFACTURER'S CATALOG CUT SHEETS OF ALL AUXILIARY COMPONENTS SUCH AS BATTERY CHARGER, SILENCER, EXHAUST FLEX, MAIN CIRCUIT BREAKER, ETC.
   c. DIMENSIONAL ELEVATION AND LAYOUT DRAWINGS OF THE GENERATOR SET, ENCLOSURE AND TRANSFER SWITCHGEAR AND RELATED ACCESSORIES. CONCRETE PAD RECOMMENDATION, LAYOUT AND STUB–UP LOCATIONS OF ELECTRICAL AND FUEL SYSTEMS SHALL BE INCLUDED.
   d. ENGINE MECHANICAL DATA, INCLUDING HEAT REJECTION, EXHAUST GAS FLOWS, COMBUSTION AIR AND VENTILATION AIR FLOWS, NOISE DATA, FUEL CONSUMPTION, ETC.
   e. GENERATOR ELECTRICAL DATA INCLUDING RESISTANCES, REACTANCES, TIME CONSTANTS, TEMPERATURE AND INSULATION DATA, THERMAL DAMAGE CURVE, COOLING REQUIREMENTS, EXCITATION RATINGS, VOLTAGE REGULATION, VOLTAGE REGULATOR, EFFICIENCIES, WAVEFORM DISTORTION AND TELEPHONE INFLUENCE FACTOR.
   f. AUTOMATIC TRANSFER SWITCH(ES).
   g. CERTIFIED TRIP CURVES FOR EACH CIRCUIT BREAKER.
   h. CERTIFIED COPIES OF ALL TYPE (DESIGN) AND VERIFICATION TEST REPORTS
   i. INTERCONNECT WIRING DIAGRAM OF COMPLETE EMERGENCY SYSTEM, INCLUDING GENERATOR, SWITCHGEAR, DAY TANK, REMOTE PUMPS, BATTERY CHARGER, REMOTE ALARM INDICATIONS.
   j. CONTROL PANEL SCHEMATICS.
   k. CALCULATIONS INDICATING ACCEPTABLE PERFORMANCE OF THE SUBMITTED UNIT STARTING AND RUNNING THE SPECIFIED LOAD.
   l. THIRD PARTY CERTIFIED NOISE TEST DATA ON AN EQUAL OR SIMILAR ENCLOSURE DESIGN.
2. SUBMIT OPERATION AND MAINTENANCE DATA BASED ON FACTORY AND FIELD–TESTING, OPERATION AND MAINTENANCE OF SPECIFIED PRODUCT.
3. SUBMIT TEST REPORT CONFIRMING ACCEPTANCE OF ALL INSTALLATION INSPECTIONS AND TESTS AS OUTLINED IN PART 3 OF THIS SPECIFICATION.
4. MANUFACTURER'S AND DEALER'S WRITTEN WARRANTY.

AUTOMATIC TRANSFER SWITCH

A. GENERAL

1. AUTOMATIC TRANSFER SWITCH SHALL CONSIST OF POWER TRANSFER UNIT AND CONTROLLER INTERCONNECTED TO PROVIDE COMPLETE AUTOMATIC OPERATION. AUTOMATIC TRANSFER SWITCH SHALL BE MECHANICALLY HELD AND ELECTRICALLY OPERATED BY SINGLE–SOLENOID MECHANISM ENERGIZED FROM THE SOURCE TO WHICH LOAD IS TO BE TRANSFERRED. SWITCH SHALL BE RATED FOR CONTINUOUS DUTY AND SHALL BE INHERENTLY DOUBLE THROW. SWITCH SHALL BE MECHANICALLY INTERLOCKED TO PROHIBIT SIMULTANEOUS CLOSURE OF BOTH NORMAL AND EMERGENCY CONTACTS. AUTOMATIC TRANSFER SWITCH SHALL BE SUITABLE FOR USE WITH ENGINE OR TURBINE–DRIVEN EMERGENCY GENERATOR AND UTILITY SOURCES. ENTIRE ASSEMBLY SHALL BE CONTAINED IN A NEMA 1 ENCLOSURE.
2. MAIN CONTACTS SHALL BE OF SILVER COMPOSITION. CONTACTS RATED 600A AND ABOVE SHALL HAVE SEGMENTED BLOW–ON CONSTRUCTION AND BE PROTECTED BY SEPARATE ARCING CONTACTS FOR WITHSTAND CAPABILITY. OPERATING TRANSFER TIME IN EITHER DIRECTION SHALL NOT EXCEED ONE–SIXTH OF ONE SECOND. AUTOMATIC TRANSFER SWITCHES WITH COMPONENTS OF MOLDED–CASE CIRCUIT BREAKERS, CONTACTORS OR COMPONENTS NOT DESIGNED FOR CONTINUOUS DUTY OR REPETITIVE LOAD TRANSFER SWITCHING WILL NOT BE ACCEPTED.
3. THE NEUTRAL CONTACTS SHALL BE FULLY RATED OVERLAPPING WHERE FOUR–POLE DESIGN IS REQUIRED BY THE DRAWINGS.
4. THE ATS SHALL BE RATED TO CLOSE ON AND WITHSTAND THE AVAILABLE FAULT CURRENT AT THE TRANSFER SWITCH TERMINALS.
5. CONTACTS, COILS, SPRINGS AND CONTROL ELEMENTS SHALL BE INSPECTABLE AND REMOVABLE FROM FRONT OF TRANSFER SWITCH WITHOUT MAJOR DISASSEMBLY OR DISCONNECTION OF POWER CONDUCTORS. A MANUAL OPERATING HANDLE SHALL BE PROVIDED TO PERMIT FULL MOVEMENT OF CONTACTS THROUGHOUT THEIR FULL TRAVEL FOR INSPECTION AND SERVICE.
6. AUTOMATIC TRANSFER SWITCH CONTROLLER SHALL BE A SINGLE MICROPROCESSOR WITH THE ABILITY TO BE NETWORKED THROUGH AN OPTIONAL SERIAL COMMUNICATIONS PORT. AN LCD DISPLAY AND KEYPAD SHALL PROVIDE ACCESS TO ALL AVAILABLE DATA AND FUNCTION FOR SETTING ALL OPERATIONAL PARAMETERS. CONTROL MODULE SHALL HAVE PROTECTIVE COVER AND SHALL BE MOUNTED SEPARATELY FROM TRANSFER SWITCH. SENSING AND CONTROL LOGIC SHALL BE SOLID–MOUNTED ON PLUG–IN PRINTED CIRCUIT BOARDS. PRINTED CIRCUIT BOARDS SHALL BE KEYED TO PREVENT INCORRECT INSTALLATION. PROVIDE INDUSTRIAL CONTROL GRADE PLUG–IN INTERFACING RELAYS WITH DUST COVERS.
7. AUTOMATIC TRANSFER SWITCH SHALL MEET NEMA ICS 2–447, NFPA 110 AND UL–1008 STANDARDS.
8. THE MANUFACTURER'S WARRANTEE SHALL BE FOR A MINIMUM PERIOD OF TWO YEARS FROM THE DATE OF INITIAL STARTUP AND ACCEPTANCE. THE WARRANTEE SHALL INCLUDE ALL LABOR, PARTS AND TRAVEL EXPENSES NECESSARY FOR REPAIRS AT THE JOB SITE.
9. THE AUTOMATIC TRANSFER SWITCH SHALL BE 300 SERIES AS MANUFACTURED BY ASCO OR APPROVED EQUAL FROM RUSSELECTRIC OR GE–ZENITH.
   - 600A, 208V, 4 Pole, 65K

B. CONTROLLER

1. VOLTAGE SENSING SHALL BE CLOSE DIFFERENTIAL THREE PHASE LINE–TO–LINE. PICKUP SHALL BE ADJUSTABLE FROM 85% TO 100% OF NOMINAL; DROPOUT VOLTAGE SHALL BE ADJUSTABLE FROM 78% TO 98% OF PICKUP VALUE. TRANSFER TO EMERGENCY SHALL BE INITIATED UPON REDUCTION OF NORMAL SOURCE TO 85% OF NOMINAL VOLTAGE AND RETRANSFER TO NORMAL SHALL OCCUR WHEN NORMAL SOURCE REACHES 95% OF NOMINAL.
2. TIME DELAY TO OVERRIDE MOMENTARY NORMAL SOURCE OUTAGES SHALL DELAY TRANSFER SWITCH SIGNALS AND ENGINE STARTING SIGNALS. TIME DELAY SHALL BE FIELD–ADJUSTABLE FROM 0.5 TO 6 SECONDS AND FACTORY SET AT 1 SECOND.
3. TIME DELAY ON RETRANSFER TO NORMAL SOURCE SHALL BE BYPASSED AUTOMATICALLY IF EMERGENCY SOURCE FAILS AND NORMAL SOURCE IS AVAILABLE. TIME DELAY SHALL BE FIELD–ADJUSTABLE FROM 0 TO 60 MINUTES.
4. UNLOADED RUNNING TIME DELAY FOR EMERGENCY GENERATOR COOLDOWN SHALL BE FIELD–ADJUSTABLE FROM 0 TO 60 MINUTES.
5. TIME DELAY ON TRANSFER TO EMERGENCY SHALL BE FIELD–ADJUSTABLE FROM 0 TO 5 MINUTES FOR CONTROLLED TIMING OF LOAD TRANSFER TO EMERGENCY, WHERE INDICATED.
6. A TIME DELAY ACTIVATED OUTPUT SIGNAL (ONE NO AND ONE NC CONTACT) SHALL BE PROVIDED TO DRIVE EXTERNAL RELAYS FOR SELECTIVE LOAD SHEDDING. THE CONTROLLER SHALL BE ADJUSTABLE FROM 0–5 MINUTES IN ANY OF THE FOLLOWING MODES:
   a. PRIOR TO TRANSFER ONLY.
   b. PRIOR TO AND AFTER TRANSFER.
   c. NORMAL TO EMERGENCY ONLY.
   d. EMERGENCY TO NORMAL ONLY.
   e. NORMAL TO EMERGENCY AND EMERGENCY TO NORMAL.
   f. ALL TRANSFER CONDITIONS OR ONLY WHEN BOTH SOURCES ARE AVAILABLE.
   g. THE CONTROLLER SHALL INCLUDE CAPABILITIES FOR OPTIONAL CLOSED TRANSITION AND DELAYED TRANSITION OPERATION:

C. AUXILIARIES

1. PROVIDE GOLD–PLATED CONTACT THAT CLOSES WHEN NORMAL SOURCE FAILS FOR INITIATING ENGINE STARTING, RATED 10 A, 32 V DC.
2. PROVIDE GOLD–PLATED CONTACT THAT OPENS WHEN NORMAL SOURCE FAILS FOR INITIATING ENGINE STARTING, RATED 10 A, 32 V DC.
3. PROVIDE PUSH TO TEST LED INDICATORS, GREEN TO INDICATE WHEN AUTOMATIC TRANSFER SWITCH IS CONNECTED TO NORMAL SOURCE AND RED TO INDICATE WHEN AUTOMATIC TRANSFER SWITCH IS CONNECTED TO EMERGENCY SOURCE.
4. PROVIDE TWO AUXILIARY CONTACTS THAT ARE CLOSED WHEN AUTOMATIC TRANSFER SWITCH IS CONNECTED TO NORMAL AND TWO AUXILIARY CONTACTS THAT ARE CLOSED WHEN AUTOMATIC TRANSFER SWITCH IS CONNECTED TO EMERGENCY. CONTACTS SHALL BE RATED 10 A, 480 V AC, 60 HZ.
5. PROVIDE TRANSFER INHIBIT INPUT TO PROHIBIT TRANSFER OF THE ATS FROM NORMAL TO EMERGENCY UPON A DRY CONTACT SIGNAL (OPEN ON INHIBIT). INSTALL A LABELED JUMPER ACROSS TERMINALS FROM FACTORY.
6. PROVIDE LOAD SHED INPUT TO SHED LOAD IF POWERED VIA THE EMERGENCY SOURCE UPON A DRY CONTACT SIGNAL (OPEN TO SHED). INSTALL A LABELED JUMPER ACROSS THE TERMINALS FROM THE FACTORY.
7. PROVIDE A NORMALLY CLOSED OUTPUT WHICH SHALL OPEN PRIOR TO TRANSFER FROM EMERGENCY TO NORMAL. THIS OUTPUT SHALL BE USED TO WARN THE ELEVATOR EQUIPMENT OF THE PENDING TRANSFER. THE CONTACTS SHALL BE TIME ADJUSTABLE FROM 10–300 SECONDS.
8. PROVIDE TWO (2) NORMALLY CLOSED OUTPUTS TO LOCK OUT VARIOUS STANDBY LOADS WHEN ATS IS IN EMERGENCY POSITION.

D. PROVIDE ENGINE GENERATOR EXERCISER, WHICH SHALL ALLOW UP TO SEVEN DIFFERENT EXERCISE ROUTINES. THE USER SHALL BE ABLE TO DO THE FOLLOWING TO EACH ROUTINE:

1. ENABLE OR DISABLE THE ROUTINE.
2. ENABLE OR DISABLE TRANSFER OF THE LOAD DURING THE ROUTINE.
3. SET THE START TIME, DAY, WEEK AND PERIOD.
4. SET THE DURATION OF THE RUN.
5. WHERE MULTIPLE ATSs ARE SPECIFIED, ENGINE EXERCISER OPTION IS REQUIRED IN ONE ATS ONLY.

E. IN–PHASE MOTOR TRANSFER

1. PROVIDE IN–PHASE MONITOR TO INHIBIT TRANSFER OF LOADS FROM EMERGENCY TO NORMAL SOURCES AND VICE VERSA UNTIL SOURCES ARE IN PHASE.
2. TRANSFER SHALL BE INITIATED ONLY WHEN POWER SOURCES ARE APPROACHING SYNCHRONY AND WHEN RELATIVE PHASE ANGLE CROSSES SETPOINT TOWARDS 0°.
3. IN–PHASE MONITOR SHALL OPERATE ACCURATELY REGARDLESS OF WHICH SOURCE IS AT HIGHEST FREQUENCY. IN–PHASE MONITOR SHALL BE SOLID STATE, WITH GATED SILICON TRANSISTOR CIRCUITRY TO ENSURE POSITIVE AND CRISP OPERATION INDEPENDENT OF VARIATIONS IN VOLTAGE INPUT OF 70% TO 110% OF NOMINAL, WITH TEMPERATURE BETWEEN 0 AND 45°C.
4. REPETITIVE ACCURACY THROUGHOUT TEMPERATURE AND VOLTAGE RANGES SHALL NOT EXCEED +/–30° (ELECTRICAL) OF SETTING. MONITOR SHALL BE CAPABLE OF OPERATING WITHIN FREQUENCY RANGE OF +/–3 HZ OF NOMINAL. PROVIDE MANUAL BYPASS CIRCUIT.

F. WHERE AN IN–PHASE MONITOR IS NOT MANUFACTURED FOR THE SUBMITTED TRANSFER SWITCH, THE FOLLOWING CHANGES SHALL BE INCORPORATED INTO THE DESIGN:

1. TRANSFER SWITCH SHALL BE DOUBLE–THROW ACTIVATED BY DUAL ELECTRICAL OPERATORS ENERGIZED MOMENTARILY AND CONNECTED TO TRANSFER MECHANISM WITH OVER–CENTER LINKAGE. MINIMUM TRANSFER TIME SHALL BE 400 MILLISECONDS.
2. PROVIDE FOR TIME DELAY BETWEEN OPENING CLOSED CONTACTS AND CLOSING OPEN CONTACTS SUFFICIENT TO DEMAGNETIZE LOADS.
3. MOTOR AND TRANSFORMER LOADS SHALL BE RE–ENERGIZED WITH NORMAL IN–RUSH CURRENT AFTER TRANSFER.
4. SWITCH SHALL TRANSFER IN EITHER DIRECTION WITH 70% RATED VOLTAGE APPLIED TO TERMINALS.

G. SUBMITTALS

1. THE MANUFACTURER SHALL PROVIDE COPIES OF FOLLOWING DOCUMENTS TO THE OWNER FOR REVIEW AND EVALUATION IN ACCORDANCE WITH GENERAL REQUIREMENTS OF DIVISION 1 AND DIVISION 16:
   a. FACTORY PUBLISHED SPECIFICATION SHEET INDICATING STANDARD AND OPTIONAL ACCESSORIES, RATINGS, ETC.
   b. DIMENSIONAL ELEVATION AND LAYOUT DRAWINGS OF AUTOMATIC TRANSFER SWITCH AND RELATED ACCESSORIES.
   c. CERTIFIED COPIES OF ALL TYPE (DESIGN) AND VERIFICATION TEST REPORTS
   d. INTERCONNECT WIRING DIAGRAM OF COMPLETE SYSTEM.
   e. CONTROL PANEL SCHEMATICS.
2. SUBMIT OPERATION AND MAINTENANCE DATA BASED ON FACTORY AND FIELD–TESTING, OPERATION AND MAINTENANCE OF SPECIFIED PRODUCT.
3. MANUFACTURER'S AND DEALER'S WRITTEN WARRANTY.

PART 3 – EXECUTION

EMERGENCY OR STANDBY DIESEL ELECTRIC GENERATING SYSTEM

A. INSTALLATION

1. PLACEMENT OF THE GENERATOR SHALL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR. COORDINATE PLACEMENT WITH THE OWNER'S REPRESENTATIVE AND OBTAIN ALL ASSOCIATED PERMITS AND PERMISSIONS NECESSARY FOR BLOCKAGE OF PUBLIC WAY, INTERFERENCE WITH PARKING, ETC.
2. FILL ALL FLUID LEVELS (INCLUDING FUEL WHERE APPLICABLE) TO MAXIMUM RECOMMENDED LEVELS BY THE MANUFACTURER PRIOR TO TESTING AND AFTER TESTING COMPLETED.

B. START–UP AND TESTING

1. AFTER INSTALLATION IS COMPLETE AND NORMAL POWER IS AVAILABLE, THE MANUFACTURER'S LOCAL DEALER SHALL PERFORM THE FOLLOWING:
   a. VERIFY THAT THE EQUIPMENT HAS BEEN PROPERLY INSTALLED.
   b. CHECK ALL AUXILIARY DEVICES FOR PROPER OPERATION, INCLUDING BATTERY CHARGER, JACKET WATER HEATER(S), GENERATOR SPACE HEATER, ALL REMOTE ANNUNCIATOR POINTS, ETC.
   c. TEST ALL ALARMS AND SAFETY SHUTDOWN DEVICES FOR PROPER OPERATION AND ANNUNCIATION.
   d. CHECK ALL FLUID LEVELS.
   e. START ENGINE AND CHECK FOR EXHAUST, OIL, FUEL LEAKS, VIBRATIONS, ETC.
   f. VERIFY PROPER VOLTAGE AND PHASE ROTATION AT THE TRANSFER SWITCH BEFORE CONNECTING TO THE LOAD.
   g. CONNECT THE GENERATOR TO BUILDING LOAD AND VERIFY THAT THE GENERATOR WILL START AND RUN ALL DESIGNATED LOADS. TESTING SHALL BE PERFORMED IN ACCORDANCE WITH NFPA 110 FROM A "COLD START" CONDITION. EACH OF THE FOLLOWING SHALL BE OBSERVED AND RECORDED UPON OPENING OF THE NORMAL SUPPLY CIRCUIT BREAKER TO THE ATS:
      1) TIME DELAY ON START
      2) CRANKING TIME UNTIL THE PRIME MOVER STARTS AND RUNS
      3) TIME REQUIRED TO REACH OPERATING SPEED
      4) VOLTAGE AND FREQUENCY OVERSHOOT
      5) TIME REQUIRED TO REACH STEADY STATE CONDITIONS WITH ALL SWITCHES TRANSFERRED TO THE EMERGENCY POSITION
      6) VOLTAGE, FREQUENCY AND CURRENT

      THE SYSTEM SHALL BE TESTED UNDER LOAD FOR A PERIOD OF TWO (2) HOURS. THE FOLLOWING READINGS SHALL TAKEN AT FIFTEEN (15) MINUTE INTERVALS:
      7) OIL PRESSURE
      8) COOLANT TEMPERATURE
      9) BATTERY CHARGE RATE
      10) AC VOLTS
      11) AC AMPERES– ALL PHASES
      12) FREQUENCY
      13) KILOWATTS
      14) KILOVOLT–AMPERES
      15) AMBIENT TEMPERATURE
   h. ALLOW SYSTEM TO COOL FOR 5 MINUTES.
   i. THE SYSTEM SHALL BE TESTED FOR A PERIOD OF TWO (2) HOURS WITH THE USE OF A PORTABLE RESISTIVE/REACTIVE LOADBANK AT 100% RATED LOAD AT RATED POWER FACTOR. LOAD SHALL BE APPLIED UPON REACHING RATED RPM IN ONE STEP. ALL DATA SPECIFIED IN ITEM G. ABOVE SHALL BE RECORDED FOR THIS SEGMENT UNTIL COMPLETION OF THE TWO–HOUR TEST.
   j. THE GENERATOR DISTRIBUTOR SHALL PROVIDE A WRITTEN TEST REPORT UPON COMPLETION OF TESTING. REPORT SHALL SPECIFICALLY INDICATE THE SUCCESSFUL COMPLETION OF EACH ITEM REFERENCED ABOVE AND SUBMIT ALL RECORDINGS IN A FORMAT SIMILAR TO NFPA 110 TABLES.
2. ALL COSTS ASSOCIATED WITH THE REFERENCED TESTING , INCLUDING FUEL CONSUMPTION, LOAD BANK RENTAL, TEMPORARY CABLES FROM THE GENERATOR TO THE LOAD BANK, ETC. SHALL BE INCLUDED IN THE ELECTRICAL CONTRACTORS BID PRICE.

C. PROVIDE (1) DAY OF ON–SITE TRAINING TO INSTRUCT THE OWNER'S PERSONNEL IN THE PROPER OPERATION AND MAINTENANCE OF THE EQUIPMENT. REVIEW OPERATION AND MAINTENANCE MANUALS, PARTS MANUALS, AND EMERGENCY SERVICE PROCEDURES.

AUTOMATIC TRANSFER SWITCH

A. STORAGE

1. CONTRACTOR SHALL STORE, PROTECT, AND HANDLE PRODUCTS IN ACCORDANCE WITH RECOMMENDED PRACTICES LISTED IN MANUFACTURER'S INSTALLATION AND MAINTENANCE MANUALS. CONTRACTOR SHALL STORE IN A CLEAN, DRY SPACE. COVER WITH HEAVY CANVAS OR PLASTIC TO KEEP OUT DIRT, WATER, CONSTRUCTION DEBRIS, AND TRAFFIC. HEAT ENCLOSURES TO PREVENT CONDENSATION.
2. AUTOMATIC TRANSFER SWITCHES SHALL BE LOCATED IN WELL–VENTILATED AREAS, FREE FROM EXCESS HUMIDITY, DUST AND DIRT AND AWAY FROM HAZARDOUS MATERIALS. AMBIENT TEMPERATURE OF AREA WILL BE BETWEEN –30 °C AND +25 °C. INDOOR LOCATIONS SHALL BE PROTECTED TO PREVENT MOISTURE FROM ENTERING ENCLOSURE.

B. INSTALLATION

1. PROVIDE 1/2" SPACERS FOR AUTOMATIC TRANSFER SWITCHES MOUNTED AT EXTERIOR WALLS BELOW GRADE TO ESTABLISH 1/2" AIR SPACE BEHIND ENCLOSURE.
2. INSPECT INSTALLED AUTOMATIC TRANSFER SWITCHES FOR ANCHORING, ALIGNMENT, GROUNDING AND PHYSICAL DAMAGE. CLEAN INTERIORS TO REMOVE CONSTRUCTION DEBRIS, DIRT AND SHIPPING MATERIALS.
3. CHECK TIGHTNESS OF ALL ELECTRICAL CONNECTIONS WITH CALIBRATED TORQUE WRENCH. MINIMUM ACCEPTABLE VALUES ARE SPECIFIED IN MANUFACTURER'S INSTRUCTIONS.
4. EACH AUTOMATIC TRANSFER SWITCH SHALL HAVE LAMINATED PLASTIC NAMEPLATES WITH WHITE CUT LETTERS IDENTIFYING POWER SOURCE, VOLTAGE AND CIRCUIT IDENTIFIED FOR BOTH INPUTS AND THE OUTPUT.

C. START–UP AND TESTING

1. AFTER INSTALLATION IS COMPLETE AND NORMAL AND EMERGENCY POWER IS AVAILABLE, THE MANUFACTURER'S LOCAL DEALER SHALL PERFORM THE FOLLOWING:
   a. VERIFY THAT THE EQUIPMENT HAS BEEN PROPERLY INSTALLED.
   b. CHECK ALL TRANSFER SWITCH FUNCTIONS FOR PROPER OPERATION.
   c. CHECK ALL AUXILIARY DEVICE FUNCTIONS FOR PROPER OPERATION. PERFORM INTEGRATED TESTING AS OUTLINED IN THE GENERATOR SPECIFICATION
2. PROVIDE (1) DAY OF ON–SITE TRAINING TO INSTRUCT THE OWNER'S PERSONNEL IN THE PROPER OPERATION AND MAINTENANCE OF THE EQUIPMENT. REVIEW OPERATION AND MAINTENANCE MANUALS, PARTS MANUALS, AND EMERGENCY SERVICE PROCEDURES.

RDK ENGINEERS

Andover, MA - Boston, MA - Amherst, MA

Durham, NC - Charlotte, NC

RDK Engineers
200 Brickstone Square
Andover, MA 01810-1488

T.978-475-0298
F.978-475-5768
W. www.rdkengineers.com

REVISIONS

DATE	CHK	DESCRIPTION

SEAL

PROJECT

NUMBER 20100320.00

DATE 01-23-2012

NEWTON PUBLIC SCHOOL
EDUCATIONAL CENTER SCHOOL
GENERATOR UPGRADE
NEWTON, MA 02459

DRAWING

DRAWN BY KVM

CHECKED BY SG

SCALE NONE

ELECTRICAL SPECIFICATIONS

BID DOCUMENTS
01-23-2012

E0.02

RDK

DEMOLITION NOTES:

1. REFER TO DRAWING E0.00 FOR LEGEND, SYMBOLS AND GENERAL NOTES.

2. REFER TO THE ELECTRICAL DRAWINGS FOR THE FULL EXTENT OF THE SCOPE OF DEMOLITION. DISCONNECT AND MAKE SAFE ALL ELECTRICAL EQUIPMENT IDENTIFIED FOR REMOVAL ON THE ELECTRICAL PLANS.

3. THE ELECTRICAL DEMOLITION PLANS AND DETAILS INDICATE THE GENERAL INTENT AND ARE NOT INTENDED TO SHOW ALL ITEMS TO BE REMOVED OR RETAINED. THE ELECTRICAL CONTRACTOR SHALL VISIT THE SITE PRIOR TO THE SUBMISSION OF BIDS TO BECOME FAMILIAR WITH THE ACTUAL CONDITIONS AND EXTENT OF WORK. DEVICES AND EQUIPMENT LOCATED ON WALLS AND/OR CEILINGS TO BE REMOVED SHALL BE DISCONNECTED AND MADE SAFE. THE ELECTRICAL CONTRACTOR SHALL NOTIFY THE OWNER'S REPRESENTATIVE OF ANY UNANTICIPATED HIDDEN CONDITIONS ENCOUNTERED DURING DEMOLITION.

4. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR OF ALL SYSTEMS OR BUILDING COMPONENTS DAMAGED DURING THE EXECUTION OF THE WORK. DAMAGE SHALL INCLUDE BUT NOT BE LIMITED TO DESTRUCTION OR DISPOSAL OF ITEMS INTENDED TO REMAIN OR TO BE SALVAGED.

5. THE ELECTRICAL CONTRACTOR SHALL CIRCUIT TRACE AND LABEL ALL EXISTING BRANCH CIRCUITS AND FEEDERS WITHIN THE AREA OF DEMOLITION SCOPE PRIOR TO DE–ENERGIZING AND DISCONNECTION. ALL CIRCUITS WITHIN PANELBOARDS IDENTIFIED FOR REMOVAL SHALL BE TRACED AND LABELED TO ENSURE THAT NO AREA OUTSIDE THE DEMOLITION SCOPE LIMIT IS AFFECTED.

6. THE ELECTRICAL CONTRACTOR SHALL IDENTIFY ALL BRANCH CIRCUITS, FEEDERS AND SYSTEM COMPONENTS, WHICH ARE TO REMAIN WITHIN THE AREA OF DEMOLITION SCOPE. THERE SHALL BE NO INTERRUPTION OF SERVICE TO ANY AREA OUTSIDE THE SCOPE LIMITS WITHOUT APPROVAL FROM THE OWNER'S REPRESENTATIVE. EXISTING EQUIPMENT TO REMAIN SHALL BE LEFT IN A CODE COMPLIANT MANNER.

7. THE ELECTRICAL CONTRACTOR SHALL DE–ENERGIZE AND REMOVE ALL CONDUCTORS AND RACEWAYS TO THEIR POINTS OF ORIGIN WITHIN THE AREA OF DEMOLITION SCOPE. ITEMS IDENTIFIED FOR DEMOLITION SHALL NOT BE ABANDONED IN PLACE. RACEWAYS THAT ENTER MASONRY WALLS AND FLOORS SHALL BE CUT FLUSH AT THE SURFACE FOR PATCHING BY OTHERS. ALL CIRCUIT BREAKERS ASSOCIATED WITH THE DEMOLITION SCOPE SHALL BE DE–ENERGIZED AND LABELED SPARE.

8. THE ELECTRICAL CONTRACTOR SHALL TEMPORARILY SUPPORT ALL ITEMS TO REMAIN THAT ARE AFFECTED BY THE DEMOLITION OF BUILDING STRUCTURAL COMPONENTS (WALLS, CEILINGS, ETC.). TEMPORARILY SUPPORTED ITEMS SHALL BE PERMANENTLY SUPPORTED AND INSTALLED WHEN FINALIZED STRUCTURES ARE IN PLACE.

9. ALL REMOVED ITEMS SHALL BE LEGALLY DISPOSED OF UNLESS IDENTIFIED FOR REUSE. THE OWNER'S REPRESENTATIVE SHALL INSPECT ALL RETAINED ITEMS PRIOR TO PLACEMENT IN THE IDENTIFIED STORAGE LOCATION BY THE ELECTRICAL CONTRACTOR.

10. ALL DEMOLITION SCOPE ASSOCIATED WITH LOW VOLTAGE SYSTEMS INCLUDING BUT NOT LIMITED TO TELEPHONE, DATA, SECURITY, PAGING, CCTV, ETC. SHALL BE INCLUDED IN THIS CONTRACT.

RDK ENGINEERS

Andover, MA - Boston, MA - Amherst, MA

Durham, NC - Charlotte, NC

RDK Engineers
200 Brickstone Square
Andover, MA 01810-1488

T.978-475-0298
F.978-475-5768
W. www.rdkengineers.com

REVISIONS

▲	DATE	CHK	DESCRIPTION

SEAL

PROJECT

NUMBER
20100320.00

DATE
01-23-2012

NEWTON PUBLIC SCHOOL EDUCATIONAL CENTER SCHOOL GENERATOR UPGRADE
NEWTON, MA 02459

DRAWING

DRAWN BY
KVM

CHECKED BY
SG

SCALE
1/8" = 1'-0"

ELECTRICAL GROUND FLOOR DEMOLITION POWER PLAN

BID DOCUMENTS
01-23-2012

1/8" = 1' - 0" 0 8' 16'

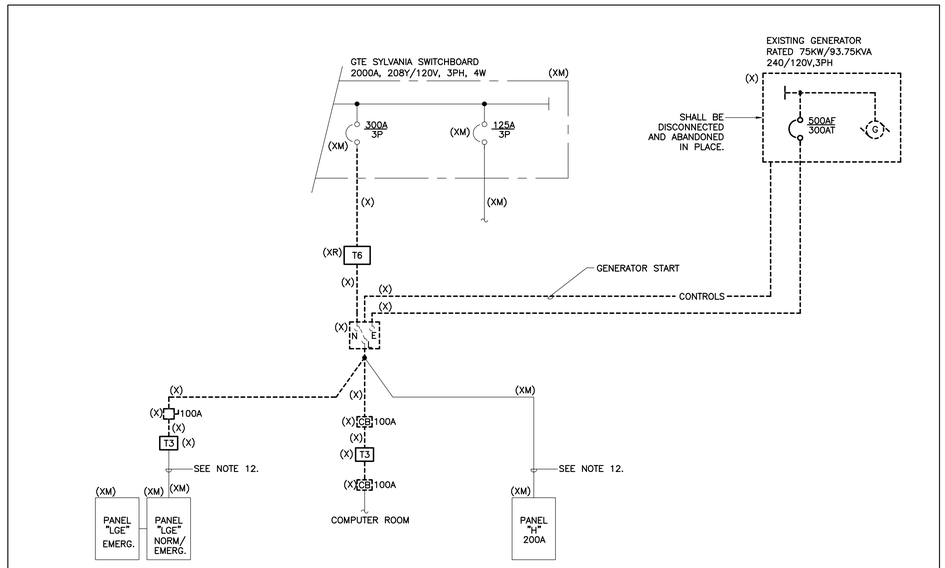
ED3.00

RDK

EXISTING SWITCHBOARD SCHEDULE

TAG: E SYLVANIA | VOLT: 208Y120 | 3 PHASE | 4 WIRE
BUS: 2000 AMPS | MAIN: 2000 AMPS | AIC: 65K AMPS SYM

CIRCUIT NO.	LOAD DESIGNATION	OVERCURRENT DEVICE FRAME	TRIP	POLE	LOAD KVA	HP	REMARKS
MAIN	MAIN CIRCUIT BREAKER	1200	1200	3			
METERING	BECo METERING						
1	PANELS BB + CC	-	300A	3	-	-	
2	NORMAL EMERG	-	300A	3	-	-	
3	PANEL AA	-	225A	3	-	-	
4	PANELS G2 + G3	-	225A	3	-	-	
5	ELEVATOR	-	125A	3	-	-	
6	SPARE (OFF)	-	125A	3	-	-	
7	PANEL LGA	-	100A	3	-	-	
8	PANEL LGD	-	100A	3	-	-	
9	PANEL L1B	-	100A	3	-	-	
10	PANEL L2A	-	100A	3	-	-	
11	PANEL KITCHEN	-	100A	3	-	-	
12	PANEL EE + FF		300A	3	-	-	
13	COMP RM A/C		250A	3	-	-	
14	PANEL PGB COMP RM A/C		225A	3	-	-	
15	SPARE (OFF)		225A	3	-	-	
16	SPARE (OFF)		125A	3	-	-	
17	SPACE						
18	PANEL LGB		100A	3	-	-	
19	PANEL L1D		100A	3	-	-	
20	PANEL L1C		100A	3	-	-	
21	PANEL L2B		100A	3	-	-	
22	SPACE						



EXISTING POWER AND STAND-BY
ONE LINE RISER DIAGRAM
N.T.S.

DEMOLITION NOTES:

1. REFER TO DRAWING E0.00 FOR LEGEND, SYMBOLS AND GENERAL NOTES.

2. REFER TO THE ELECTRICAL DRAWINGS FOR THE FULL EXTENT OF THE SCOPE OF DEMOLITION. DISCONNECT AND MAKE SAFE ALL ELECTRICAL EQUIPMENT IDENTIFIED FOR REMOVAL ON THE ELECTRICAL PLANS.

3. THE ELECTRICAL DEMOLITION PLANS AND DETAILS INDICATE THE GENERAL INTENT AND ARE NOT INTENDED TO SHOW ALL ITEMS TO BE REMOVED OR RETAINED. THE ELECTRICAL CONTRACTOR SHALL VISIT THE SITE PRIOR TO THE SUBMISSION OF BIDS TO BECOME FAMILIAR WITH THE ACTUAL CONDITIONS AND EXTENT OF WORK. DEVICES AND EQUIPMENT LOCATED ON WALLS AND/OR CEILINGS TO BE REMOVED SHALL BE DISCONNECTED AND MADE SAFE. THE ELECTRICAL CONTRACTOR SHALL NOTIFY THE OWNER'S REPRESENTATIVE OF ANY UNANTICIPATED HIDDEN CONDITIONS ENCOUNTERED DURING DEMOLITION.

4. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR OF ALL SYSTEMS OR BUILDING COMPONENTS DAMAGED DURING THE EXECUTION OF THE WORK. DAMAGE SHALL INCLUDE BUT NOT BE LIMITED TO DESTRUCTION OR DISPOSAL OF ITEMS INTENDED TO REMAIN OR TO BE SALVAGED.

5. THE ELECTRICAL CONTRACTOR SHALL CIRCUIT TRACE AND LABEL ALL EXISTING BRANCH CIRCUITS AND FEEDERS WITHIN THE AREA OF DEMOLITION SCOPE PRIOR TO DE-ENERGIZING AND DISCONNECTION. ALL CIRCUITS WITHIN PANELBOARDS IDENTIFIED FOR REMOVAL SHALL BE TRACED AND LABELED TO ENSURE THAT NO AREA OUTSIDE THE DEMOLITION SCOPE LIMIT IS AFFECTED.

6. THE ELECTRICAL CONTRACTOR SHALL IDENTIFY ALL BRANCH CIRCUITS, FEEDERS AND SYSTEM COMPONENTS, WHICH ARE TO REMAIN WITHIN THE AREA OF DEMOLITION SCOPE. THERE SHALL BE NO INTERRUPTION OF SERVICE TO ANY AREA OUTSIDE THE SCOPE LIMITS WITHOUT APPROVAL FROM THE OWNER'S REPRESENTATIVE. EXISTING EQUIPMENT TO REMAIN SHALL BE LEFT IN A CODE COMPLIANT MANNER.

7. THE ELECTRICAL CONTRACTOR SHALL DE-ENERGIZE AND REMOVE ALL CONDUCTORS AND RACEWAYS TO THEIR POINTS OF ORIGIN WITHIN THE AREA OF DEMOLITION SCOPE. ITEMS IDENTIFIED FOR DEMOLITION SHALL NOT BE ABANDONED IN PLACE. RACEWAYS THAT ENTER MASONRY WALLS AND FLOORS SHALL BE CUT FLUSH AT THE SURFACE FOR PATCHING BY OTHERS. ALL CIRCUIT BREAKERS ASSOCIATED WITH THE DEMOLITION SCOPE SHALL BE DE-ENERGIZED AND LABELED SPARE.

8. THE ELECTRICAL CONTRACTOR SHALL TEMPORARILY SUPPORT ALL ITEMS TO REMAIN THAT ARE AFFECTED BY THE DEMOLITION OF BUILDING STRUCTURAL COMPONENTS (WALLS, CEILINGS, ETC.). TEMPORARILY SUPPORTED ITEMS SHALL BE PERMANENTLY SUPPORTED AND INSTALLED WHEN FINALIZED STRUCTURES ARE IN PLACE.

9. ALL REMOVED ITEMS SHALL BE LEGALLY DISPOSED OF UNLESS IDENTIFIED FOR REUSE. THE OWNER'S REPRESENTATIVE SHALL INSPECT ALL RETAINED ITEMS PRIOR TO PLACEMENT IN THE IDENTIFIED STORAGE LOCATION BY THE ELECTRICAL CONTRACTOR.

10. ALL DEMOLITION SCOPE ASSOCIATED WITH LOW VOLTAGE SYSTEMS INCLUDING BUT NOT LIMITED TO TELEPHONE, DATA, SECURITY, PAGING, CCTV, ETC. SHALL BE INCLUDED IN THIS CONTRACT.

11. THIS DRAWING IS INTENDED TO ILLUSTRATE MAJOR EQUIPMENT AND REQUIRED INTERCONNECTIONS. REFER TO THE FLOOR PLANS FOR EXACT LOCATIONS AND THE SPECIFICATIONS FOR ADDITIONAL INSTALLATION REQUIREMENTS.

12. INTERCEPT/EXTEND TO NEW DISTRIBUTION PANEL "SD2GA". MATCH EXISTING WIRING. REFER TO DRAWING E3.00 FOR EXACT LOCATION.

RDK ENGINEERS

Andover, MA - Boston, MA - Amherst, MA

Durham, NC - Charlotte, NC

RDK Engineers
200 Brickstone Square
Andover, MA 01810-1488

T.978-475-0298
F.978-475-5768
W. www.rdkengineers.com

REVISIONS

▲	DATE	CHK	DESCRIPTION

SEAL

PROJECT

NUMBER
20100320.00

DATE
01-23-2012

NEWTON PUBLIC SCHOOL
EDUCATIONAL CENTER
SCHOOL
GENERATOR UPGRADE
NEWTON, MA 02459

DRAWING

DRAWN BY
KVM

CHECKED BY
SG

SCALE
1/8" = 1'-0"

ELECTRICAL
ONE LINE RISER
DEMOLITION PLAN

BID DOCUMENTS
01-23-2012

1/8" = 1' - 0"
0 8' 16'

ED7.00

RDK
ENGINEERS
Andover, MA - Boston, MA - Amherst, MA
Durham, NC - Charlotte, NC

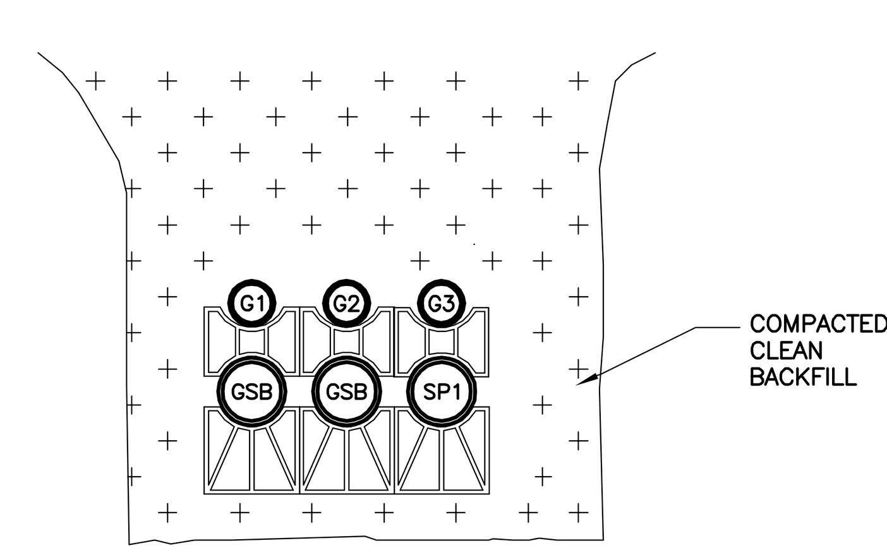
RDK Engineers
200 Brickstone Square
Andover, MA 01810-1488

T.978-475-0298
F.978-475-5768
W. www.rdkengineers.com

BURIED CONDUIT SCHEDULE

CONDUIT TAG	DESCRIPTION	CONDUIT SIZE	FROM	TO	CONDUCTORS	NOTES
GSB	GENERATOR STAND-BY SERVICE	4"C (PVC SCHEDULE 40)	GENERATOR	ATS	REFER TO E7.00	
SP1	SPARE CONDUIT	2-1/2"C (PVC SCHEDULE 40)	GENERATOR	ATS	---	SEE NOTE #1
G1	GENERATOR REMOTE ANNUNCIATOR OR BMS	1"C (PVC SCHEDULE 40)	GENERATOR	SWITCHBOARD	REFER TO E7.00	
G2	GENERATOR START CIRCUIT	1"C (PVC SCHEDULE 40)	GENERATOR	ATS	REFER TO E7.00	
G3	JACKET HEATER AND BATTERY CHARGER	1"C (PVC SCHEDULE 40)	GENERATOR	SWITCHBOARD	REFER TO E7.00	

NOTES:
1. PROVIDE CONDUIT WITH NYLON PULL STRING.



SECTION A–A
N.T.S.

NOTES:
1. REFER TO TYPICAL ELECTRICAL BURIED DETAIL ON DRAWING E8.00 FOR GENERAL CONSTRUCTION REQUIREMENTS.

2. REFER TO THE BURIED CONDUIT SCHEDULE ON THIS SHEET FOR CONDUIT AND CONDUCTOR REQUIREMENTS ASSOCIATED WITH CONDUIT TAG.

ELECTRICAL BURIED CONDUIT SECTIONS

SITE NOTES:

1. REFER TO DRAWING E0.00 FOR LEGEND, SYMBOLS AND GENERAL NOTES.
NOTES 1–6 ON THIS DRAWING ARE GENERAL AND APPLY TO THE ENTIRE SITE INSTALLATION.

2. REFER TO SITE DETAILS ON DRAWING E8.00 FOR ADDITIONAL INFORMATION.

3. ALL CONDUITS ROUTED BENEATH PAVED SURFACES OR ROADWAYS SHALL BE SCHEDULE 40 PVC ENCASED IN MINIMUM OF 3" CONCRETE. CONCRETE SHALL EXTEND A MINIMUM OF 24" FROM EDGE OF PAVED SURFACE. REFER TO TYPICAL DUCTBANK DETAIL ON DRAWING E8.00 FOR ADDITIONAL INFORMATION.

4. ALL CONDUITS ROUTED BENEATH SHALL BE MINIMUM OF SCHEDULE 40 PVC. PROVIDE WARNING TAPE A MINIMUM OF 18 INCHES ABOVE THE BURIED SERVICE.

5. ALL CONDUIT RISERS SHALL UTILIZE LONG RADIUS GALVANIZED RIGID STEEL SWEEPS.

6. VOLTAGE DROP HAS BEEN CONSIDERED IN THE DESIGN OF ALL FEEDER SIZES BASED UPON THE ILLUSTRATED EQUIPMENT LAYOUTS AND SHORTEST CONDUCTOR/RACEWAY ROUTING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEVIATIONS TAKEN THAT WILL INCREASE CONDUCTOR/RACEWAY ROUTING LENGTHS. VOLTAGE DROP SHALL NOT EXCEED TO 2% PER NEC.

BID DOCUMENTS
01-23-2012

1/8" = 1' - 0"
0 8' 16'

REVISIONS

▲	DATE	CHK	DESCRIPTION

SEAL

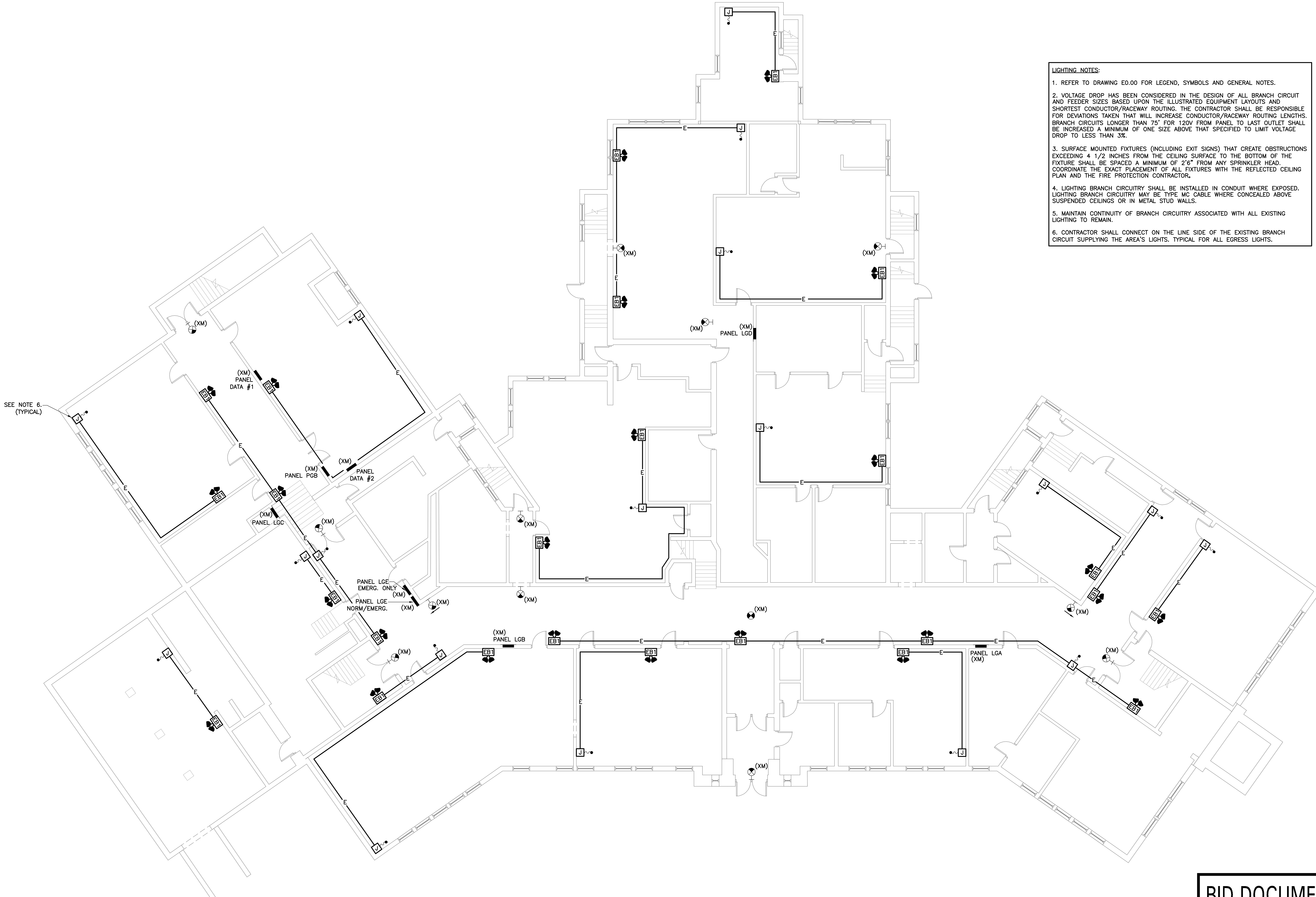
PROJECT
NUMBER 20100320.00
DATE 01-23-2012

NEWTON PUBLIC SCHOOL
EDUCATIONAL CENTER SCHOOL
GENERATOR UPGRADE
NEWTON, MA 02459

DRAWING
DRAWN BY KVM
CHECKED BY SG
SCALE 1/8" = 1'-0"

ELECTRICAL SITE PLAN

E1.00



LIGHTING NOTES:

1. REFER TO DRAWING E0.00 FOR LEGEND, SYMBOLS AND GENERAL NOTES.

2. VOLTAGE DROP HAS BEEN CONSIDERED IN THE DESIGN OF ALL BRANCH CIRCUIT AND FEEDER SIZES BASED UPON THE ILLUSTRATED EQUIPMENT LAYOUTS AND SHORTEST CONDUCTOR/RACEWAY ROUTING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEVIATIONS TAKEN THAT WILL INCREASE CONDUCTOR/RACEWAY ROUTING LENGTHS. BRANCH CIRCUITS LONGER THAN 75' FOR 120V FROM PANEL TO LAST OUTLET SHALL BE INCREASED A MINIMUM OF ONE SIZE ABOVE THAT SPECIFIED TO LIMIT VOLTAGE DROP TO LESS THAN 3%.

3. SURFACE MOUNTED FIXTURES (INCLUDING EXIT SIGNS) THAT CREATE OBSTRUCTIONS EXCEEDING 4 1/2 INCHES FROM THE CEILING SURFACE TO THE BOTTOM OF THE FIXTURE SHALL BE SPACED A MINIMUM OF 2'6" FROM ANY SPRINKLER HEAD. COORDINATE THE EXACT PLACEMENT OF ALL FIXTURES WITH THE REFLECTED CEILING PLAN AND THE FIRE PROTECTION CONTRACTOR.

4. LIGHTING BRANCH CIRCUITRY SHALL BE INSTALLED IN CONDUIT WHERE EXPOSED. LIGHTING BRANCH CIRCUITRY MAY BE TYPE MC CABLE WHERE CONCEALED ABOVE SUSPENDED CEILINGS OR IN METAL STUD WALLS.

5. MAINTAIN CONTINUITY OF BRANCH CIRCUITRY ASSOCIATED WITH ALL EXISTING LIGHTING TO REMAIN.

6. CONTRACTOR SHALL CONNECT ON THE LINE SIDE OF THE EXISTING BRANCH CIRCUIT SUPPLYING THE AREA'S LIGHTS. TYPICAL FOR ALL EGRESS LIGHTS.

RDK ENGINEERS

Andover, MA - Boston, MA - Amherst, MA

Durham, NC - Charlotte, NC

RDK Engineers
200 Brickstone Square
Andover, MA 01810-1488

T.978-475-0298
F.978-475-5768
W. www.rdkengineers.com

REVISIONS

	DATE	CHK	DESCRIPTION

SEAL

PROJECT

NUMBER
20100320.00

DATE
01-23-2012

NEWTON PUBLIC SCHOOL EDUCATIONAL CENTER SCHOOL GENERATOR UPGRADE NEWTON, MA 02459

DRAWING

DRAWN BY
KVM

CHECKED BY
SG

SCALE
1/8" = 1'-0"

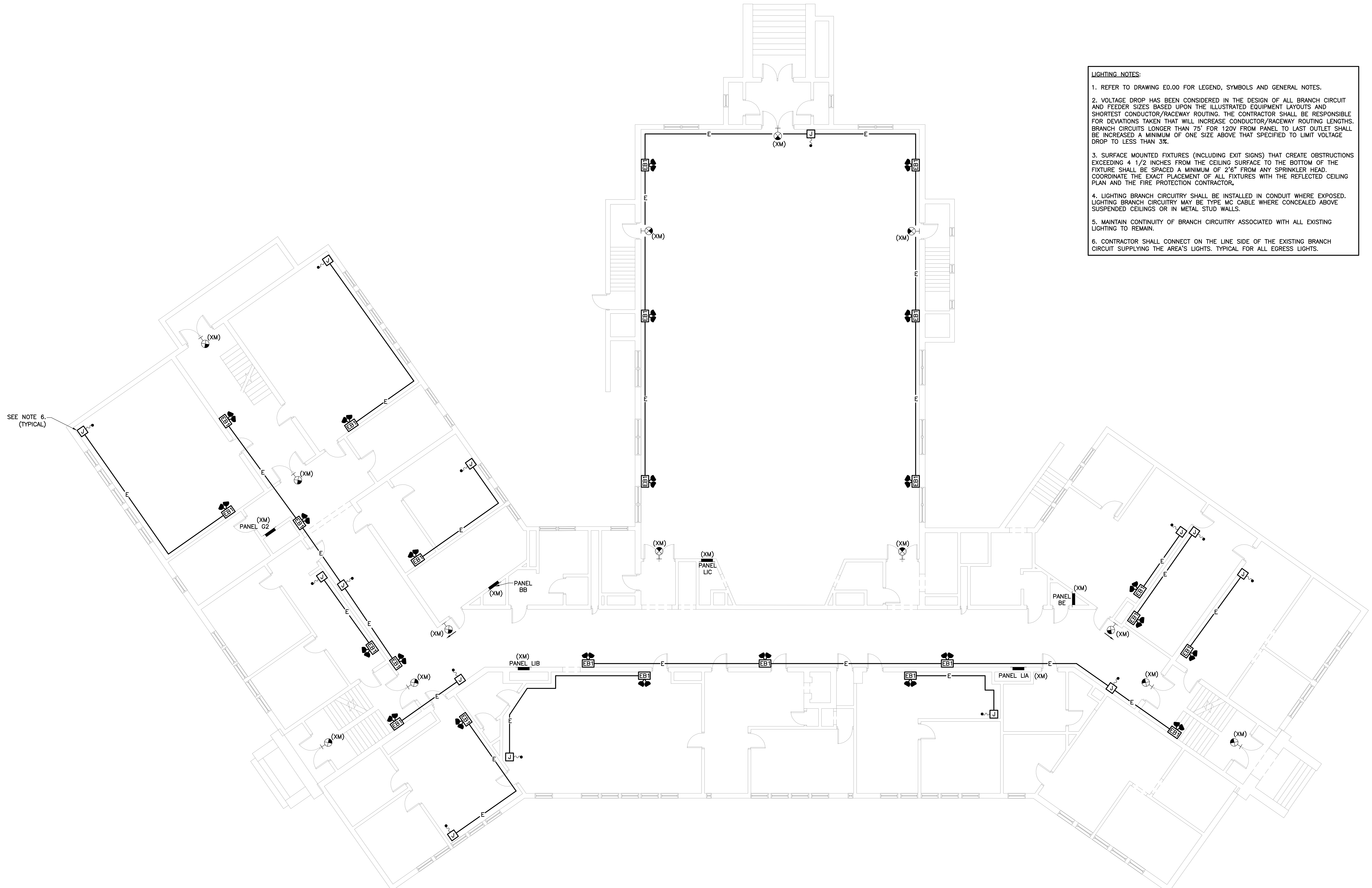
ELECTRICAL GROUND FLOOR STAND-BY LIGHTING PLAN

BID DOCUMENTS
01-23-2012

1/8" = 1' - 0"   0   8'   16'

E2.00

RDK



LIGHTING NOTES:

1. REFER TO DRAWING E0.00 FOR LEGEND, SYMBOLS AND GENERAL NOTES.

2. VOLTAGE DROP HAS BEEN CONSIDERED IN THE DESIGN OF ALL BRANCH CIRCUIT AND FEEDER SIZES BASED UPON THE ILLUSTRATED EQUIPMENT LAYOUTS AND SHORTEST CONDUCTOR/RACEWAY ROUTING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEVIATIONS TAKEN THAT WILL INCREASE CONDUCTOR/RACEWAY ROUTING LENGTHS. BRANCH CIRCUITS LONGER THAN 75' FOR 120V FROM PANEL TO LAST OUTLET SHALL BE INCREASED A MINIMUM OF ONE SIZE ABOVE THAT SPECIFIED TO LIMIT VOLTAGE DROP TO LESS THAN 3%.

3. SURFACE MOUNTED FIXTURES (INCLUDING EXIT SIGNS) THAT CREATE OBSTRUCTIONS EXCEEDING 4 1/2 INCHES FROM THE CEILING SURFACE TO THE BOTTOM OF THE FIXTURE SHALL BE SPACED A MINIMUM OF 2'6" FROM ANY SPRINKLER HEAD. COORDINATE THE EXACT PLACEMENT OF ALL FIXTURES WITH THE REFLECTED CEILING PLAN AND THE FIRE PROTECTION CONTRACTOR.

4. LIGHTING BRANCH CIRCUITRY SHALL BE INSTALLED IN CONDUIT WHERE EXPOSED. LIGHTING BRANCH CIRCUITRY MAY BE TYPE MC CABLE WHERE CONCEALED ABOVE SUSPENDED CEILINGS OR IN METAL STUD WALLS.

5. MAINTAIN CONTINUITY OF BRANCH CIRCUITRY ASSOCIATED WITH ALL EXISTING LIGHTING TO REMAIN.

6. CONTRACTOR SHALL CONNECT ON THE LINE SIDE OF THE EXISTING BRANCH CIRCUIT SUPPLYING THE AREA'S LIGHTS. TYPICAL FOR ALL EGRESS LIGHTS.

RDK ENGINEERS

Andover, MA - Boston, MA - Amherst, MA
Durham, NC - Charlotte, NC

RDK Engineers
200 Brickstone Square
Andover, MA 01810-1488

T.978-475-0298
F.978-475-5768
W. www.rdkengineers.com

REVISIONS

▲	DATE	CHK	DESCRIPTION

SEAL

PROJECT

NUMBER
20100320.00

DATE
01-23-2012

NEWTON PUBLIC SCHOOL
EDUCATIONAL CENTER SCHOOL
GENERATOR UPGRADE
NEWTON, MA 02459

DRAWING

DRAWN BY
KVM

CHECKED BY
SG

SCALE
1/8" = 1'-0"

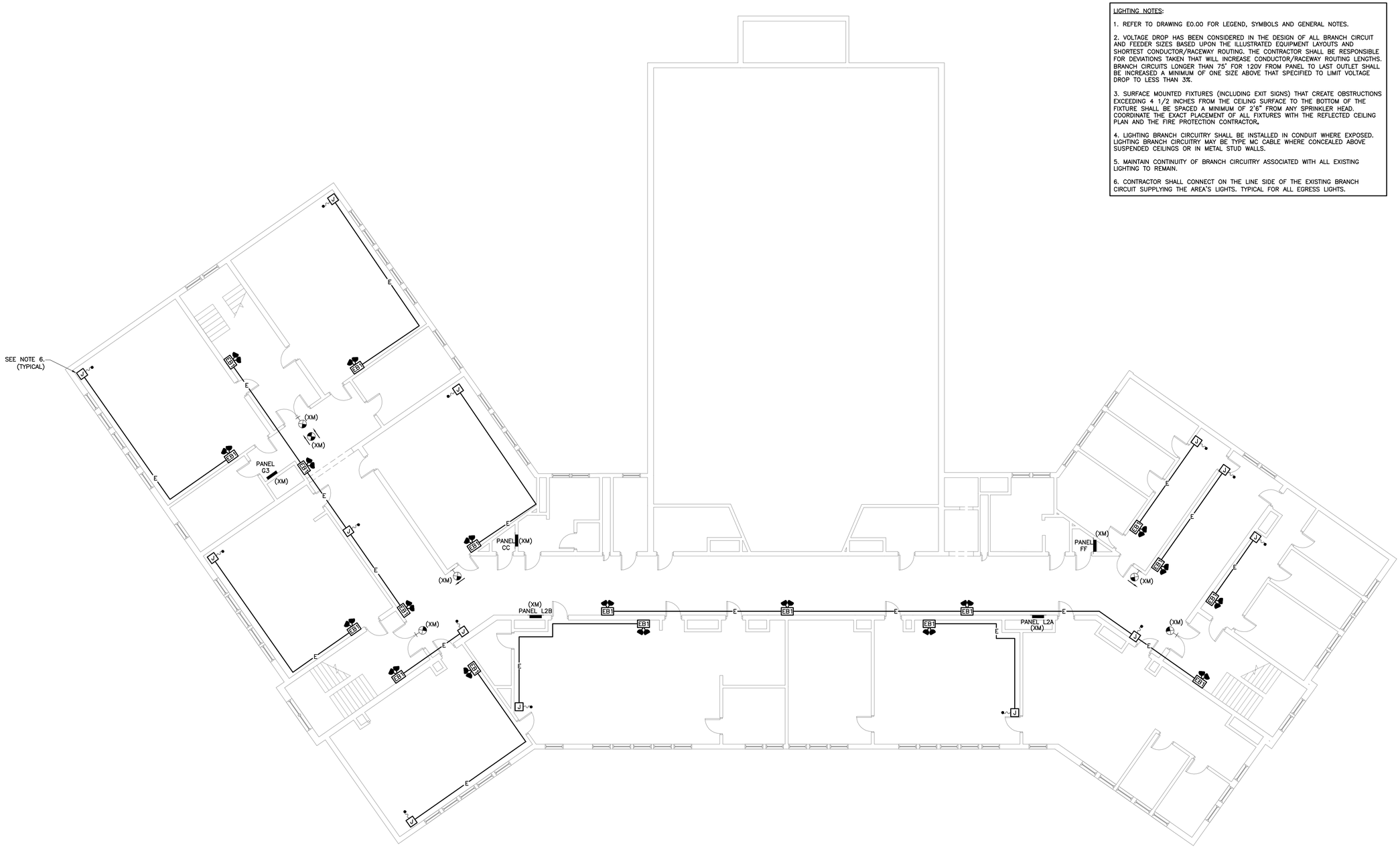
ELECTRICAL
FIRST FLOOR
STAND-BY LIGHTING
PLAN

BID DOCUMENTS
01-23-2012

1/8" = 1' - 0" 0 8' 16'

E2.01

RDK



LIGHTING NOTES:

1. REFER TO DRAWING E0.00 FOR LEGEND, SYMBOLS AND GENERAL NOTES.

2. VOLTAGE DROP HAS BEEN CONSIDERED IN THE DESIGN OF ALL BRANCH CIRCUIT AND FEEDER SIZES BASED UPON THE ILLUSTRATED EQUIPMENT LAYOUTS AND SHORTEST CONDUCTOR/RACEWAY ROUTING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEVIATIONS TAKEN THAT WILL INCREASE CONDUCTOR/RACEWAY ROUTING LENGTHS. BRANCH CIRCUITS LONGER THAN 75' FOR 120V FROM PANEL TO LAST OUTLET SHALL BE INCREASED A MINIMUM OF ONE SIZE ABOVE THAT SPECIFIED TO LIMIT VOLTAGE DROP TO LESS THAN 3%.

3. SURFACE MOUNTED FIXTURES (INCLUDING EXIT SIGNS) THAT CREATE OBSTRUCTIONS EXCEEDING 4 1/2 INCHES FROM THE CEILING SURFACE TO THE BOTTOM OF THE FIXTURE SHALL BE SPACED A MINIMUM OF 2'6" FROM ANY SPRINKLER HEAD. COORDINATE THE EXACT PLACEMENT OF ALL FIXTURES WITH THE REFLECTED CEILING PLAN AND THE FIRE PROTECTION CONTRACTOR.

4. LIGHTING BRANCH CIRCUITRY SHALL BE INSTALLED IN CONDUIT WHERE EXPOSED. LIGHTING BRANCH CIRCUITRY MAY BE TYPE MC CABLE WHERE CONCEALED ABOVE SUSPENDED CEILINGS OR IN METAL STUD WALLS.

5. MAINTAIN CONTINUITY OF BRANCH CIRCUITRY ASSOCIATED WITH ALL EXISTING LIGHTING TO REMAIN.

6. CONTRACTOR SHALL CONNECT ON THE LINE SIDE OF THE EXISTING BRANCH CIRCUIT SUPPLYING THE AREA'S LIGHTS. TYPICAL FOR ALL EGRESS LIGHTS.

RDK ENGINEERS

Andover, MA - Boston, MA - Amherst, MA

Durham, NC - Charlotte, NC

RDK Engineers
200 Brickstone Square
Andover, MA 01810-1488

T.978-475-0298
F.978-475-5768
W. www.rdkengineers.com

REVISIONS

	DATE	CHK	DESCRIPTION

SEAL

PROJECT

NUMBER
20100320.00

DATE
01-23-2012

NEWTON PUBLIC SCHOOL
EDUCATIONAL CENTER SCHOOL
GENERATOR UPGRADE
NEWTON, MA 02459

DRAWING

DRAWN BY
KVM

CHECKED BY
SG

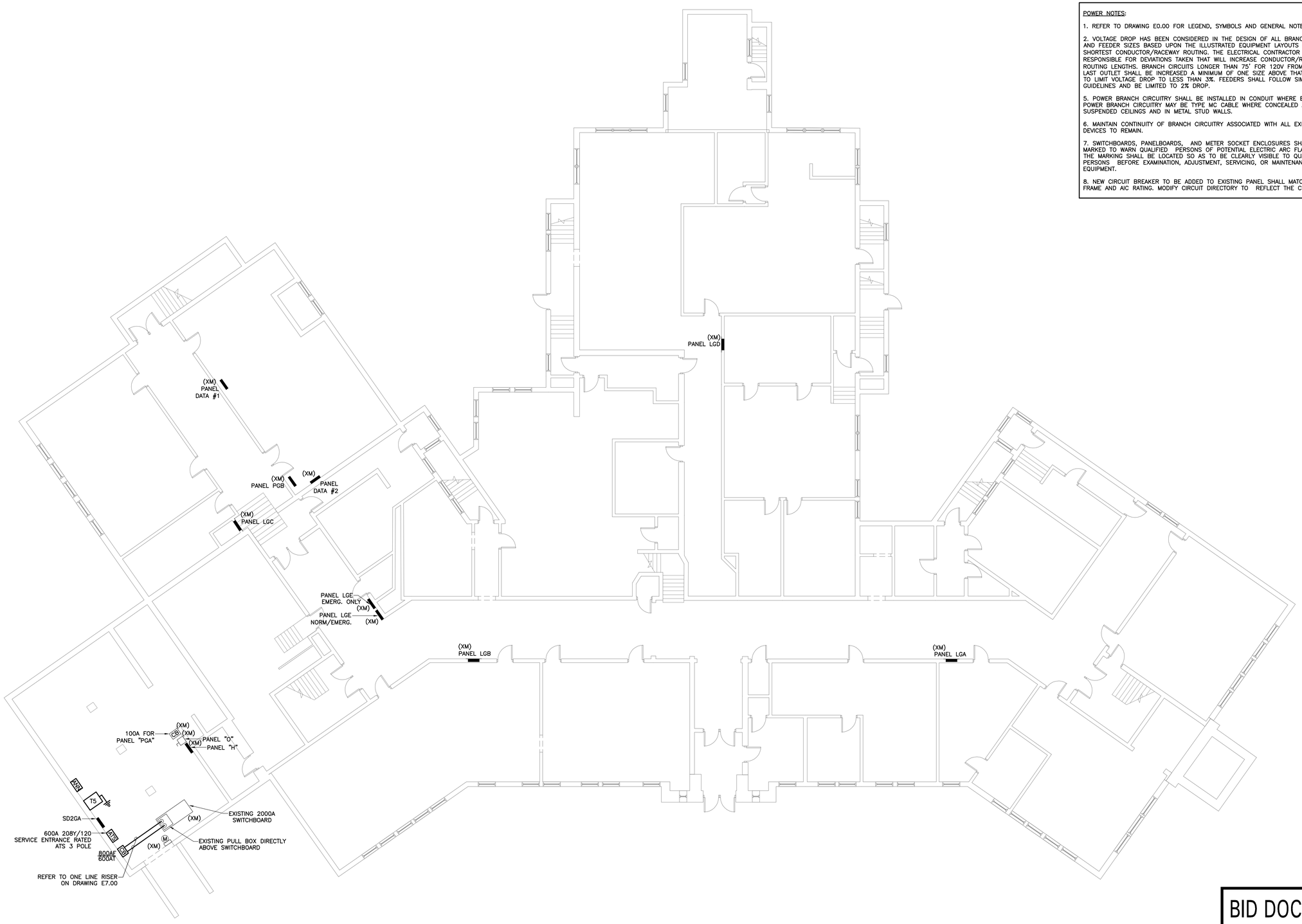
SCALE
1/8" = 1'-0"

BID DOCUMENTS
01-23-2012

ELECTRICAL
SECOND FLOOR
STAND-BY LIGHTING
PLAN

1/8" = 1' - 0"
0 8' 16'

E2.02



POWER NOTES:

1. REFER TO DRAWING E0.00 FOR LEGEND, SYMBOLS AND GENERAL NOTES.

2. VOLTAGE DROP HAS BEEN CONSIDERED IN THE DESIGN OF ALL BRANCH CIRCUITRY AND FEEDER SIZES BASED UPON THE ILLUSTRATED EQUIPMENT LAYOUTS AND SHORTEST CONDUCTOR/RACEWAY ROUTING. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR DEVIATIONS TAKEN THAT WILL INCREASE CONDUCTOR/RACEWAY ROUTING LENGTHS. BRANCH CIRCUITS LONGER THAN 75' FOR 120V FROM PANEL TO LAST OUTLET SHALL BE INCREASED A MINIMUM OF ONE SIZE ABOVE THAT SPECIFIED TO LIMIT VOLTAGE DROP TO LESS THAN 3%. FEEDERS SHALL FOLLOW SIMILAR GUIDELINES AND BE LIMITED TO 2% DROP.

5. POWER BRANCH CIRCUITRY SHALL BE INSTALLED IN CONDUIT WHERE EXPOSED. POWER BRANCH CIRCUITRY MAY BE TYPE MC CABLE WHERE CONCEALED ABOVE SUSPENDED CEILINGS AND IN METAL STUD WALLS.

6. MAINTAIN CONTINUITY OF BRANCH CIRCUITRY ASSOCIATED WITH ALL EXISTING POWER DEVICES TO REMAIN.

7. SWITCHBOARDS, PANELBOARDS, AND METER SOCKET ENCLOSURES SHALL BE FIELD MARKED TO WARN QUALIFIED PERSONS OF POTENTIAL ELECTRIC ARC FLASH HAZARDS. THE MARKING SHALL BE LOCATED SO AS TO BE CLEARLY VISIBLE TO QUALIFIED PERSONS BEFORE EXAMINATION, ADJUSTMENT, SERVICING, OR MAINTENANCE OF THE EQUIPMENT.

8. NEW CIRCUIT BREAKER TO BE ADDED TO EXISTING PANEL SHALL MATCH EXISTING FRAME AND AIC RATING. MODIFY CIRCUIT DIRECTORY TO REFLECT THE CHANGE.

RDK ENGINEERS

Andover, MA - Boston, MA - Amherst, MA

Durham, NC - Charlotte, NC

RDK Engineers
200 Brickstone Square
Andover, MA 01810-1488

T.978-475-0298
F.978-475-5768
W. www.rdkengineers.com

REVISIONS

▲	DATE	CHK	DESCRIPTION

SEAL

PROJECT

NUMBER
20100320.00

DATE
01-23-2012

NEWTON PUBLIC SCHOOL
EDUCATIONAL CENTER
SCHOOL
GENERATOR UPGRADE
NEWTON, MA 02459

DRAWING

DRAWN BY
KVM

CHECKED BY
SG

SCALE
1/8" = 1'-0"

ELECTRICAL
GROUND FLOOR
NEW POWER
PLAN

BID DOCUMENTS
01-23-2012

1/8" = 1' - 0"
0 8' 16'

E3.00

POWER NOTES:

1. REFER TO DRAWING E0.00 FOR LEGEND, SYMBOLS AND GENERAL NOTES.

2. VOLTAGE DROP HAS BEEN CONSIDERED IN THE DESIGN OF ALL BRANCH CIRCUITRY AND FEEDER SIZES BASED UPON THE ILLUSTRATED EQUIPMENT LAYOUTS AND SHORTEST CONDUCTOR/RACEWAY ROUTING. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR DEVIATIONS TAKEN THAT WILL INCREASE CONDUCTOR/RACEWAY ROUTING LENGTHS. BRANCH CIRCUITS LONGER THAN 75' FOR 120V FROM PANEL TO LAST OUTLET SHALL BE INCREASED A MINIMUM OF ONE SIZE ABOVE THAT SPECIFIED TO LIMIT VOLTAGE DROP TO LESS THAN 3%. FEEDERS SHALL FOLLOW SIMILAR GUIDELINES AND BE LIMITED TO 2% DROP.

5. POWER BRANCH CIRCUITRY SHALL BE INSTALLED IN CONDUIT WHERE EXPOSED. POWER BRANCH CIRCUITRY MAY BE TYPE MC CABLE WHERE CONCEALED ABOVE SUSPENDED CEILINGS AND IN METAL STUD WALLS.

6. MAINTAIN CONTINUITY OF BRANCH CIRCUITRY ASSOCIATED WITH ALL EXISTING POWER DEVICES TO REMAIN.

7. SWITCHBOARDS, PANELBOARDS, AND METER SOCKET ENCLOSURES SHALL BE FIELD MARKED TO WARN QUALIFIED PERSONS OF POTENTIAL ELECTRIC ARC FLASH HAZARDS. THE MARKING SHALL BE LOCATED SO AS TO BE CLEARLY VISIBLE TO QUALIFIED PERSONS BEFORE EXAMINATION, ADJUSTMENT, SERVICING, OR MAINTENANCE OF THE EQUIPMENT.

8. THIS DRAWING IS INTENDED TO ILLUSTRATE MAJOR EQUIPMENT AND REQUIRED INTERCONNECTIONS. REFER TO THE FLOOR PLANS FOR EXACT LOCATIONS AND THE SPECIFICATIONS FOR ADDITIONAL INSTALLATION REQUIREMENTS.

9. TAP BUS IN ACCORDANCE WITH NEC 240.21(B)(4) 25' TAP RULE.

DISTRIBUTION PANEL SCHEDULE

PANEL: SD2GA VOLT: 208Y/120 3 PHASE 4 WIRE

BUS: 600 AMPS MAIN: 600 AMPS AIC: 10K AMPS SYM

CIRCUIT	LOAD DESIGNATION	OVERCURRENT DEVICE			LOAD		REMARKS
NO.		FRAME	TRIP	POLE	KVA	HP	
1	PANEL H	400	400	3			
2	PANEL LGE	100	100	3			
3	COMPUTER ROOM	100	100	3			
4	SPARE	100	100	3			
5	HEAT JACKET	20	20	1			
6	BATTERY CHARGER	30	30	1			
7							
8							

NOTES:

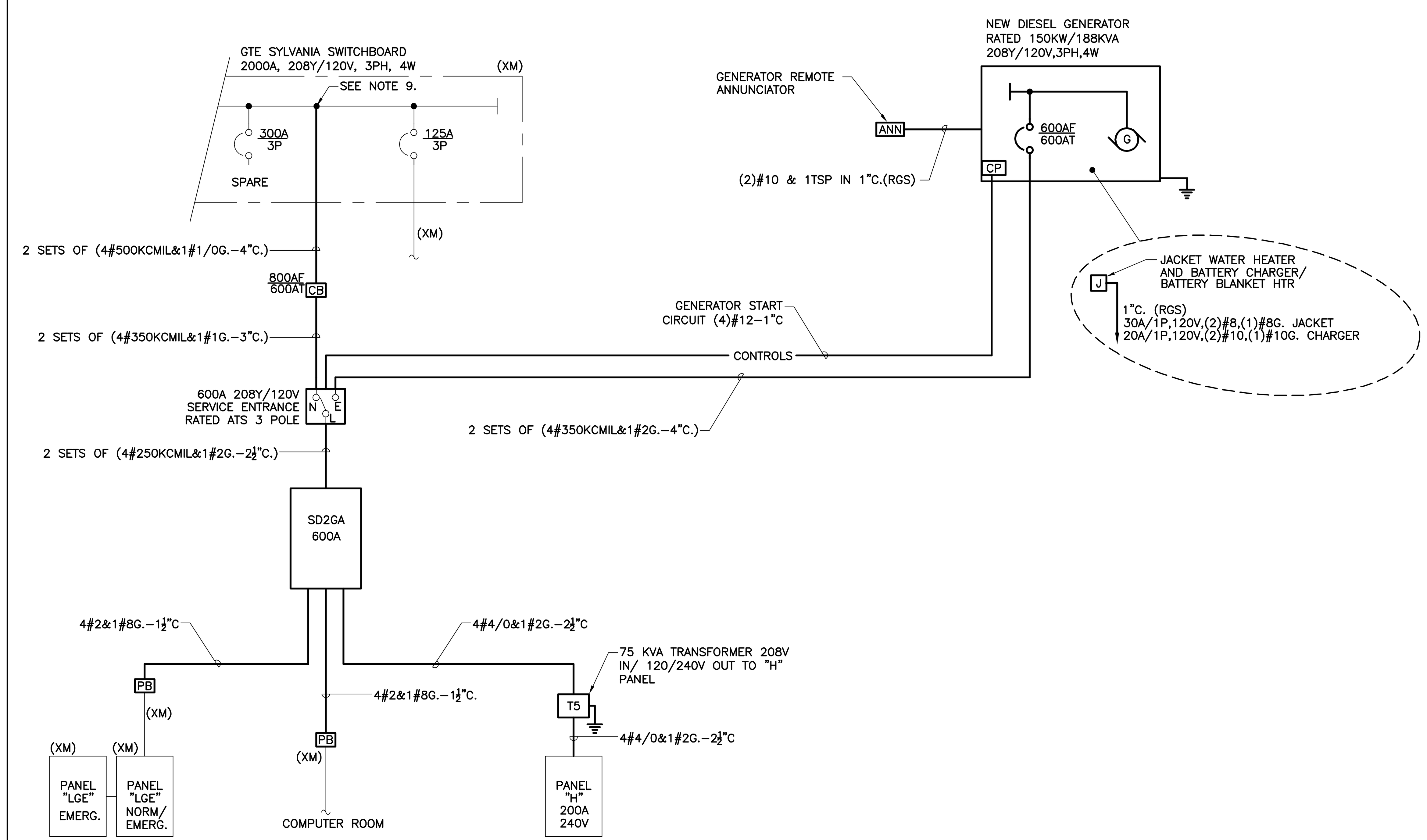
1. PROVIDE LUGS TO ACCOMMODATE FEEDER SIZES AS IDENTIFIED ON THE RISER DIAGRAM FOR SUPPLY AND ALL LOADS. (THIS NOTE APPLICABLE TO ALL TERMINATIONS.)
2. "SPACE" SHALL CONSTITUTE ALL REQUIRED BUS, SUPPORTS AND HARDWARE NECESSARY TO INSTALL THE PROTECTIVE DEVICE UP TO THE FRAME LIMITATION INDICATED.
3. NOTES 4-8 ARE OPTIONS WHICH SHALL BE SPECIFCALLY NOTED IN REMARKS FOR INCLUSION.
4. PROVIDE WITH FEED THRU LUGS.
5. PROVIDE WITH 200% NEUTRAL
6. PROVIDE WITH ISOLATED GROUND BUS.
7. PROVIDE SHUNT TRIP AUXILIARY ATTACHMENT TO THE CIRCUIT BREAKER.
8. PROVIDE TRANSIENT VOLTAGE SURGE SUPPRESSION. REFER TO SPECIFICATIONS FOR CLASS.

EXISTING SWITCHBOARD SCHEDULE

TAG: E SYLVANIA VOLT: 208Y120 3 PHASE 4 WIRE

BUS: 2000 AMPS MAIN: 2000 AMPS AIC: 65K AMPS SYM

CIRCUIT	LOAD DESIGNATION	OVERCURRENT DEVICE			LOAD		REMARKS
NO.		FRAME	TRIP	POLE	KVA	HP	
MAIN	MAIN CIRCUIT BREAKER	1200	1200	3			
METERING	BECo METERING						
1	PANELS BB + CC	-	300A	3	-	-	
2	NORMAL EMERG	-	300A	3	-	-	
3	PANEL AA	-	225A	3	-	-	
4	PANELS G2 + G3	-	225A	3	-	-	
5	ELEVATOR	-	125A	3	-	-	
6	SPARE (OFF)	-	125A	3	-	-	
7	PANEL LGA	-	100A	3	-	-	
8	PANEL LGD	-	100A	3	-	-	
9	PANEL L1B	-	100A	3	-	-	
10	PANEL L2A	-	100A	3	-	-	
11	PANEL KITCHEN	-	100A	3	-	-	
12	PANEL EE + FF		300A	3	-	-	
13	COMP RM A/C		250A	3	-	-	
14	PANEL PGB COMP RM A/C		225A	3	-	-	
15	SPARE (OFF)		225A	3	-	-	
16	SPARE (OFF)		125A	3	-	-	
17	SPACE						
18	PANEL LGB		100A	3	-	-	
19	PANEL L1D		100A	3	-	-	
20	PANEL L1C		100A	3	-	-	
21	PANEL L2B		100A	3	-	-	
22	SPACE						



NEW POWER AND STAND-BY
ONE LINE RISER DIAGRAM
N.T.S.

RDK ENGINEERS

Andover, MA - Boston, MA - Amherst, MA

Durham, NC - Charlotte, NC

RDK Engineers
200 Brickstone Square
Andover, MA 01810-1488

T.978-475-0298
F.978-475-5768
W. www.rdkengineers.com

REVISIONS

DATE	CHK	DESCRIPTION

SEAL

PROJECT

NUMBER
20100320.00

DATE
01-23-2012

NEWTON PUBLIC SCHOOL
EDUCATIONAL CENTER SCHOOL
GENERATOR UPGRADE
NEWTON, MA 02459

DRAWING

DRAWN BY
KVM

CHECKED BY
SG

SCALE
1/8" = 1'-0"

ELECTRICAL
ONE LINE RISER
NEW WORK PLAN

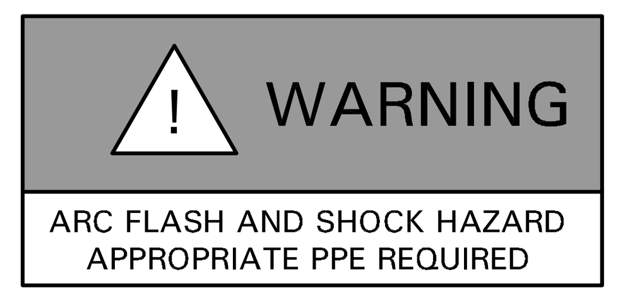
BID DOCUMENTS
01-23-2012

1/8" = 1' - 0"
0 8' 16'

E7.00

RDK

NOTES:
1. REFER TO DRAWING E0.00 FOR LEGENDS, SYMBOLS AND GENERAL NOTES.

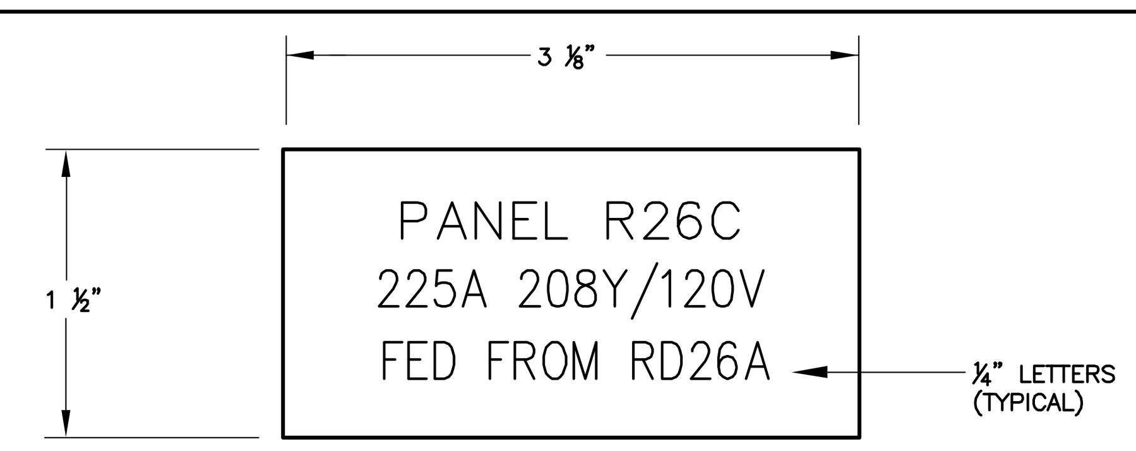


NOTES:

1. REFER TO SPECIFICATIONS FOR ADDITIONAL NAMEPLATE REQUIREMENTS.

2. PROVIDE ON ALL IN-LINE METER SOCKETS, SWITCHBOARDS, DISTRIBUTION PANELS, PANELBOARDS AND MOTOR CONTROL CENTERS IN ACCORDANCE WITH NEC 110.16.

RDK TYPICAL FLASH PROTECTION WARNING LABEL EP005A



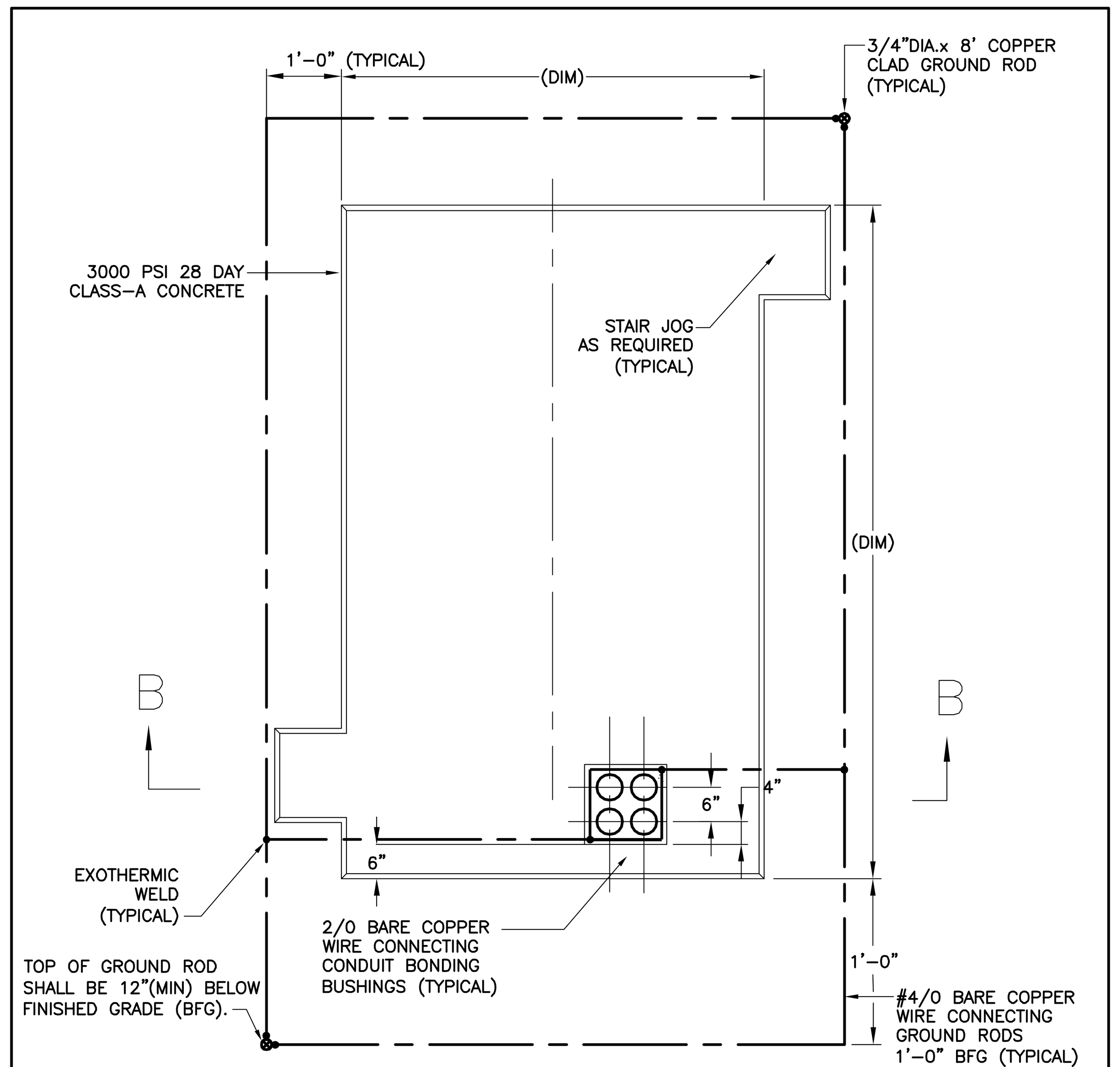
NOTES:
1. REFER TO SPECIFICATIONS FOR ADDITIONAL NAMEPLATE REQUIREMENTS.

2. NAMEPLATE TO BE 1/16" THICK PLASTIC WITH WHITE CENTER LAMINATION. FACE SHALL BE BLACK, ENGRAVED LETTERS SHALL BE WHITE.

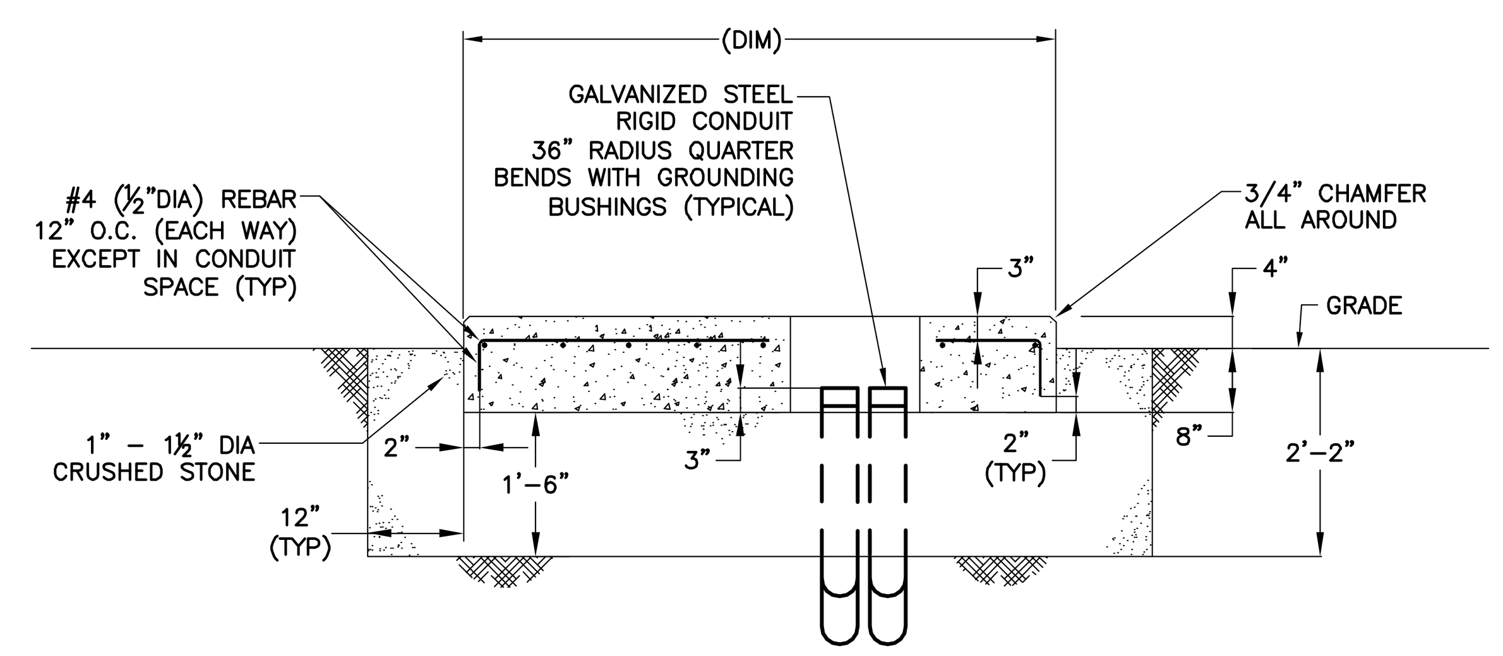
3. SECURE NAMEPLATE TO SURFACES WITH HIGH STRENGTH ADHESIVE CEMENT. UTILIZE MECHANICAL FASTENERS FOR ALL EXTERIOR LOCATIONS.

4. TYPICAL FOR MOUNTING ON "SWITCHBOARDS", "PANELBOARDS", "STARTERS", "DISCONNECTS", AND "TRANSFORMERS".

RDK TYPICAL ENGRAVED PLASTIC NAMEPLATE DETAIL EP003



PLAN VIEW



SECTION "B-B"

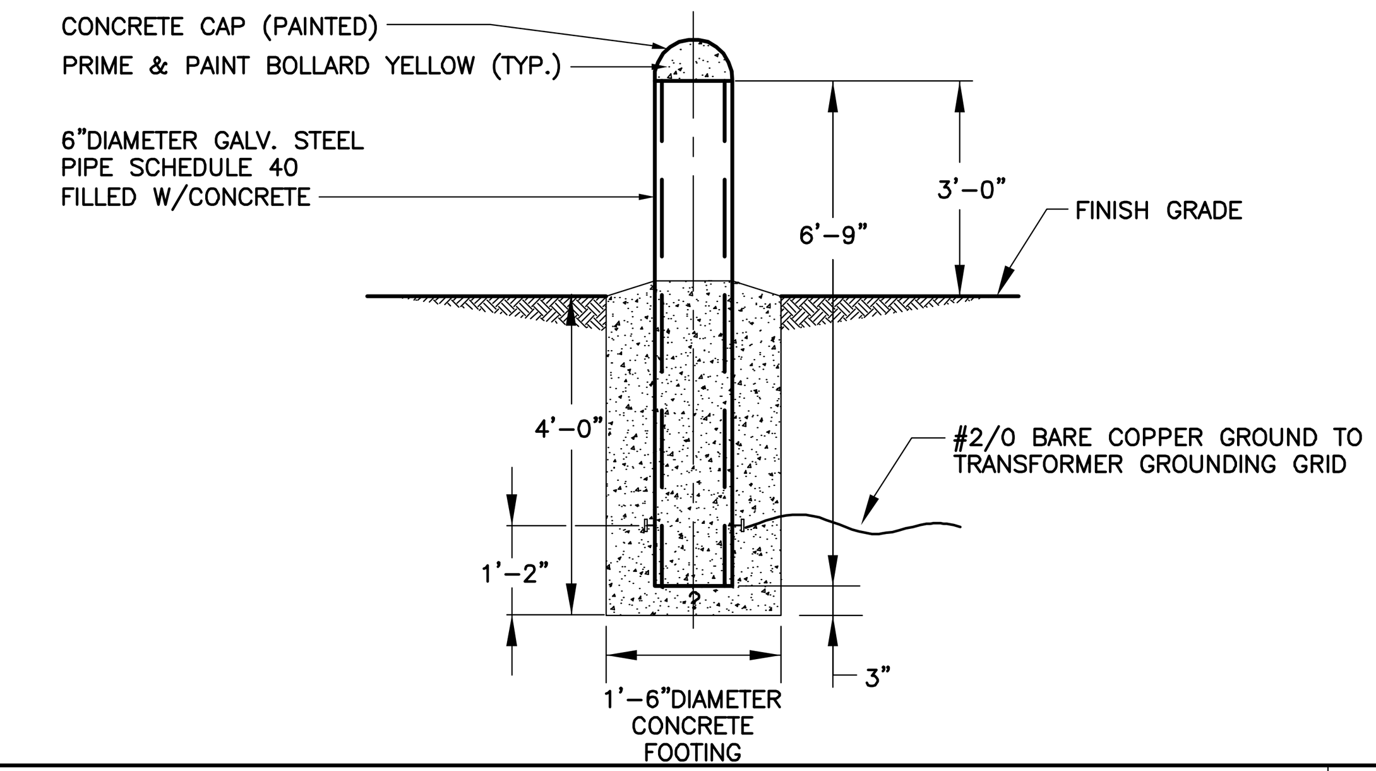
NOTES:
1. REFER TO EXACT INSTALLATION REQUIREMENTS OF THE GENERATOR AND ASSOCIATED ENCLOSURE MANUFACTURER FOR MODIFICATIONS THAT MAY BE REQUIRED TO THIS PAD LAYOUT. THIS DETAIL IS INTENDED TO ILLUSTRATE GENERAL REQUIREMENTS. PAD SHALL EXTEND 1'-0" BEYOND ENCLOSURE ON ALL SIDES. PAD SHALL JOG OUT TO ACCOMMODATE STAIR LANDINGS.

2. ALL GROUND GRID CONNECTIONS SHALL BE EXOTHERMIC WELD.

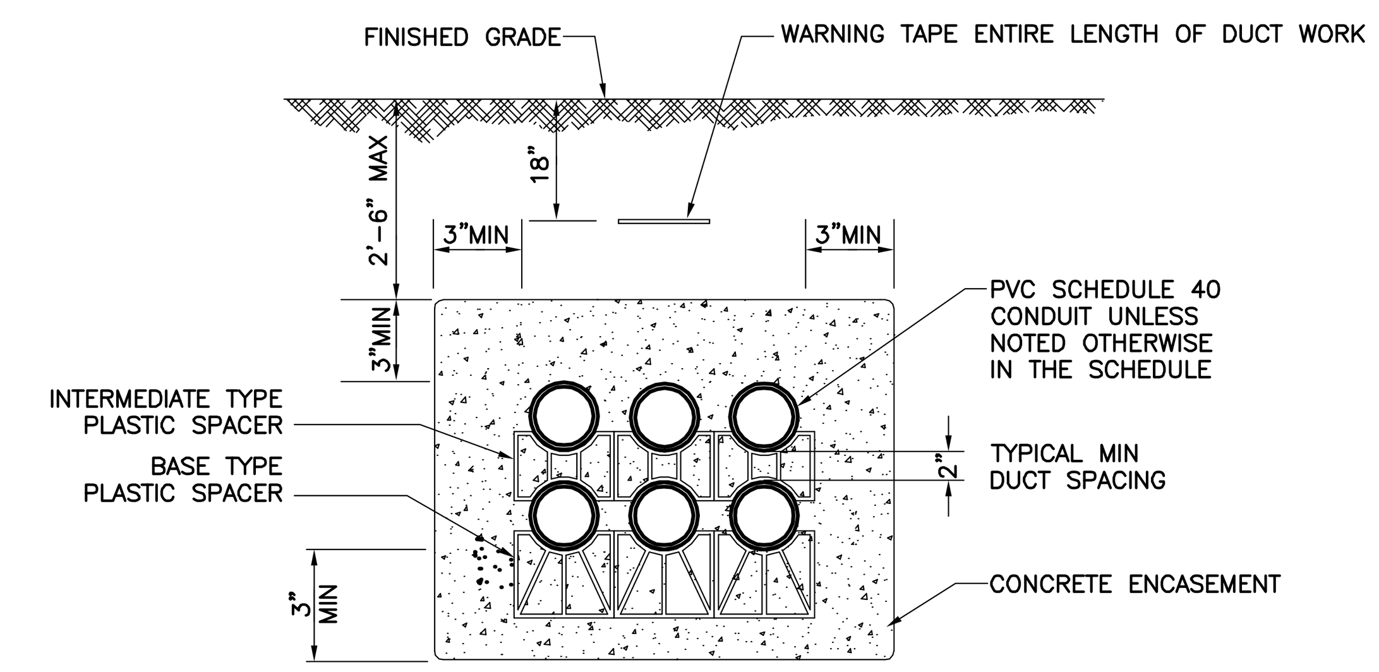
3. CAP ALL CONDUIT ENDS TO PREVENT MOISTURE AND DEBRIS FROM ENTERING CONDUITS PRIOR TO GENERATOR INSTALLATION.

4. CRUSHED STONE SHALL EXTEND TO COVER GROUND AT SPECIFIED 18" DEPTH UNDER ALL AIR INTAKE LOUVER LOCATIONS.

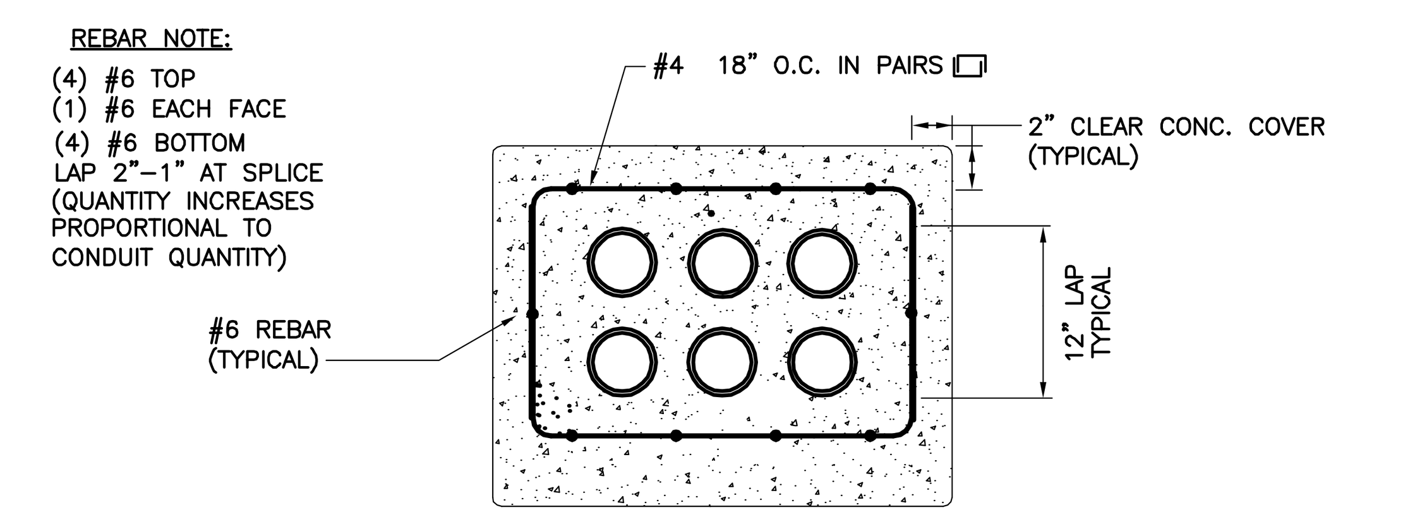
RDK GENERATOR PAD DETAIL ES011



RDK PROTECTION BOLLARD DETAIL ES012



TYPICAL DUCT SECTION



REBAR DETAIL

NOTES:

1. THIS DETAIL IS INTENDED TO ILLUSTRATE CONSTRUCTION OF TYPICAL DUCT BANK. REFER TO REFERENCED SECTION FOR QUANTITY AND SIZE OF CONDUIT REQUIRED. DUCT CONSTRUCTION SHALL BE MODIFIED TO ACCOMMODATE REQUIREMENTS ILLUSTRATED IN THE ACTUAL SECTION, UTILIZING THE CRITERIA ESTABLISHED IN THIS DETAIL AND AS WRITTEN IN THE SPECIFICATIONS.

2. REBAR SHALL BE USED FOR ALL DUCT BANKS INSTALLED UNDER TRAVELED WAYS, ROADWAYS, AND TRANSITIONS INTO MANHOLES/HANDHOLES AND FOUNDATIONS. REFER TO SPECIFICATIONS FOR ADDITIONAL DETAILS.

3. WARNING TAPE SHALL BE DETECTABLE TYPE FOIL BACKED 4 MIL POLYETHYLENE WITH FADE RESISTANT "BURIED ELECTRIC LINE BELOW" A MINIMUM OF 12 INCHES ABOVE THE BURIED SERVICE. TAPE SHALL BE EQUAL TO T & B NAF-0705

RDK TYPICAL ELECTRICAL DUCT DETAIL ES002

RDK ENGINEERS
Andover, MA - Boston, MA - Amherst, MA
Durham, NC - Charlotte, NC
RDK Engineers
200 Brickstone Square
Andover, MA 01810-1488
T.978-475-0298
F.978-475-5768
W. www.rdkengineers.com

REVISIONS

DATE	CHK	DESCRIPTION

SEAL

PROJECT
NUMBER 20100320.00
DATE 01-23-2012

NEWTON PUBLIC SCHOOL EDUCATIONAL CENTER SCHOOL GENERATOR UPGRADE NEWTON, MA 02459

DRAWING
DRAWN BY KVM
CHECKED BY SG
SCALE 1/8" = 1'-0"

ELECTRICAL DETAILS

BID DOCUMENTS
01-23-2012

1/8" = 1' - 0" 0 8' 16'

E8.00

RDK